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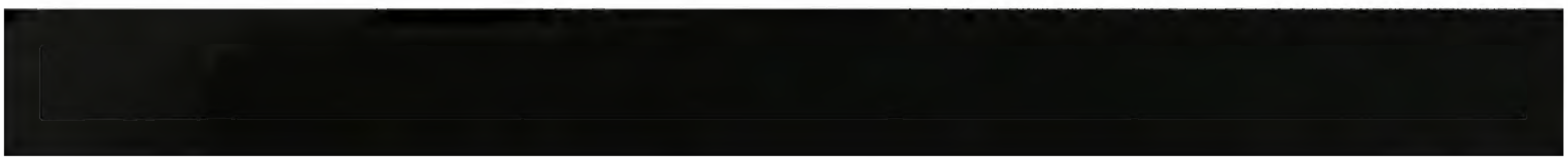

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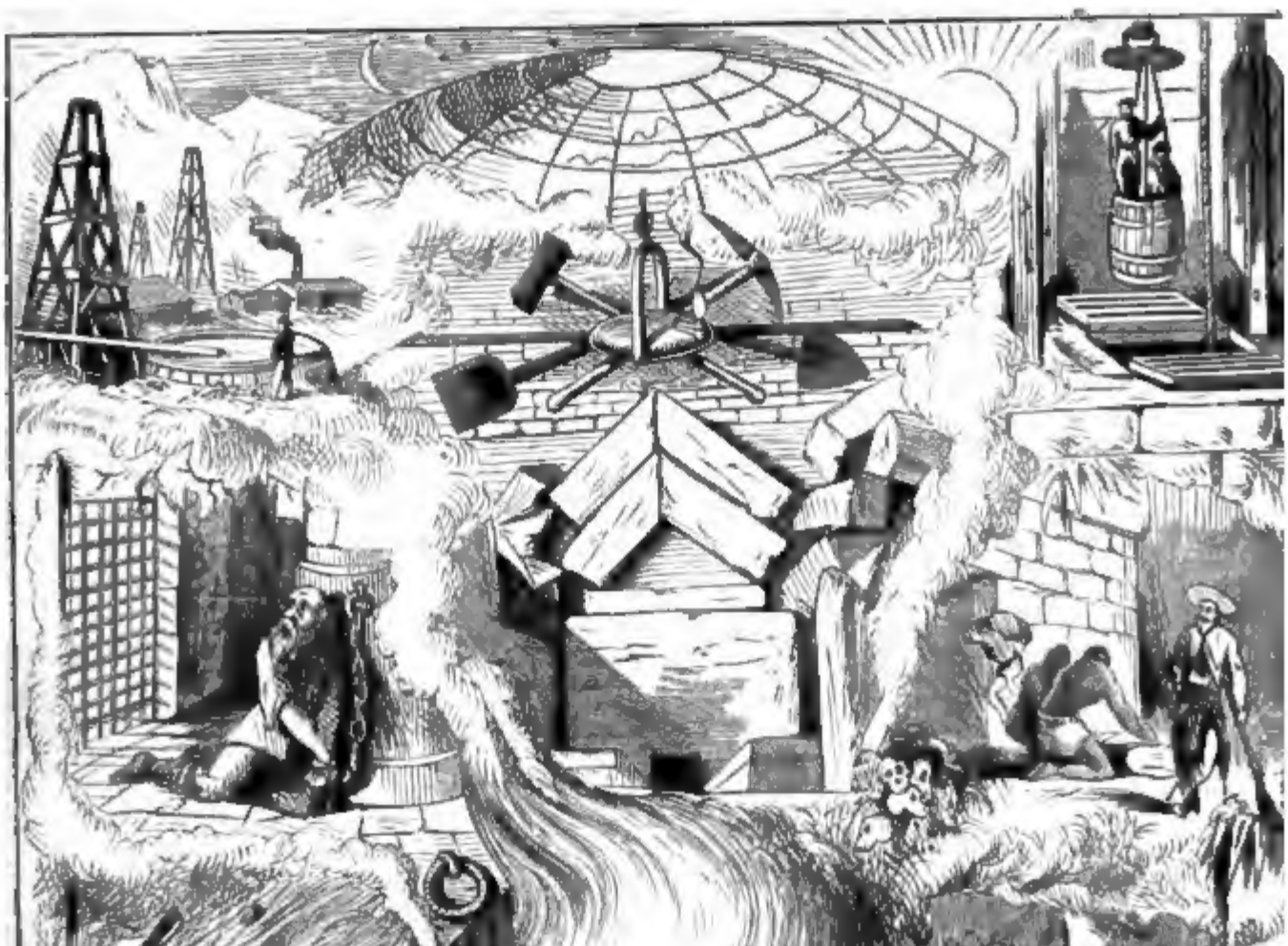
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THE

UNDERGROUND WORLD:

A MIRROR OF

LIFE BELOW THE SURFACE,

WITH VIVID DESCRIPTIONS OF THE

HIDDEN WORKS OF NATURE AND ART.

COMPRISING

INCIDENTS AND ADVENTURES BEYOND THE LIGHT OF DAY.

INTERESTING SKETCHES

OF

MINES AND MINING IN ALL PARTS OF THE WORLD — CAVES AND THEIR MYSTERIES — FAMOUS TUNNELS — DOWN IN THE DEPTHS OF THE SEA. VOLCANOES AND THEIR ERUPTIONS — PETROLEUM — UNDERGROUND LIFE OF MAN AND THE LOWER ANIMALS. SUBTERRANEAN WORKS OF THE ANCIENTS. BURIED TREASURES, ETC., ETC.

PROFUSELY ILLUSTRATED.

BY

THOS. W. KNOX,

Author of "Overland through Asia," "Life and Adventures in the Orient," "Camp-Fire and Cotton-Field," "The Boy Exiles," etc.

HARTFORD:

THE J. B. BURR PUBLISHING CO.

1883

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PREFACE.

The chief intent of this work is the plain, sufficient, and entertaining description of the marvelous lives not only of miners, but of all whose lot or choice it is to "delve and dare" underground. That the object is secured, the author is flatteringly assured by acknowledged critics,—travelers and book-men themselves, like the writer most of them. The narratives of the book are not merely dry relations of scientific facts freighted with unnecessary technical terms, as might possibly be suspected from a cursory glance at the list of the topics treated, but statements of most important and curious deeds, and descriptions of hidden localities and lives, interspersed with lively anecdote and "incidents with souls in them," it is believed, and the greater part herein for the first time given to the public. The table of contents will suffice to show how wide and varied has been the author's scope of observation and comment, covering all the most important parts of the globe.

But he has not been satisfied with relying wholly upon his own observations and world-studies. No man, however active and industrious, can collate and digest all the interesting information which may cluster about any important subject. The average life is too short for the performance of such exhaustive study. The author has therefore consulted many works upon mining and kindred subjects, adding their funds of knowledge to his own researches, in order, so far forth as possible, to perfect his work. Besides, he is specially indebted to Professor Simonin, author of

La Vie Souterraine, and has relied upon him for many facts and figures, particularly in regard to the coal mines of France and other countries. Many individuals, professionally conversant with the subjects discoursed of, have also been personally consulted in various countries; while several literary gentlemen of eminence have kindly lent the author their aid. Among the latter it is permissible to mention Mr. Junius Henri Browne, of New York, and the late Col. Albert S. Evans, of San Francisco.

In preparing the matter for the press, it has been found convenient to make use of words borrowed from the French and other languages, and also of terms more or less technical in their character. They are not numerous, and are so well understood either by context or by popular use that a glossary is not considered necessary.

The author takes this opportunity to thank the newspaper press and the public for the generous reception accorded to his previous publications, hoping, in the language of the business card of the times, to merit a continuance of the same.

T. W. K.

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UNDERGROUND.

I.

BELOW THE SURFACE.

DIFFUSION OF KNOWLEDGE. — WHAT THE WORLD BELIEVES. — MUNGO PARK IN AFRICA. — WHY THE NATIVES PITIED HIM. — EXTENT OF UNDERGROUND LIFE. — DISTRIBUTION OF THE EARTH'S WEALTH. — VALUE OF MINES. — THEIR EXTENT AND IMPORTANCE. — COAL AND IRON. — MYSTERIES OF MINES. — EXPERIENCE WITH A NOVICE. — CHANGES OF SEASONS TO A MINER. — DANGERS IN MINES. — LIFE IN CAVERNS. — UNDERGROUND IN METAPHOR. — SOCIAL MINING. — OBJECT OF THIS VOLUME.

In these days of fast presses, cheap books and newspapers, lightning telegraphs, and other disseminators of intelligence, there may be those who doubt the correctness of the adage which says, "One half the world does not know how the other half lives." Human nature is inquisitive. We are constantly seeking information regarding the affairs of others, and we generally manage in some way to obtain what we seek. We store our minds with useful and useless knowledge of the manners and customs of people in other lands, and of the private lives and histories of our near neighbors. Very often the material we thus lay aside in our mental storehouses does not particularly concern us, but, like Mrs. Toodles, in her purchase of a door-plate bearing the name of Thompson with a p, we think it will be handy to have at some future day, and so we keep it. With a fair devotion to inquiries, and a well-cultivated memory, a life of threescore and ten years ought, at this day, to acquaint its possessor with a general knowledge of the how and why of the existence of at least half the inhabitants of the globe.

But it may be set down as an axiom, that one half the world does not live as the other half does. People's tastes differ, and there are very few who would wish to live exactly like others, especially if those to whom the choice is offered are richer than the others. There are many who would not change places with their wealthy neighbors, and it is more than probable that their wealthy neighbors would not change places with them. The majority of sailors are not happy when on shore, but are constantly sighing for a wet sheet and a flowing sea, while the majority of landsmen have no desire for such hydropathic experience. When Mungo Park travelled in Africa, the natives expressed great pity for him because he had lost his color; they constantly mourned over the unhappy lot of the white man, and would have been quite unwilling to change complexions with him. Mungo received their sympathy with a countenance becomingly solemn, but the chances are more than even that what they regarded as a misfortune was by him considered a blessing. "Give me a bed of ice and a pillow of snow," said a moribund Laplander in Italy, "and I shall die happy." A refrigerating couch of this kind would be comfortless in the extreme to a countryman of Pauline Borghese.

A comparatively small portion of the human race lives, or would wish to live, beneath the surface of the globe. Most of us rarely go there voluntarily, and our first visits of any important duration are made after we have shuffled off this mortal coil and invoked the aid of the sexton. Then we are carried there without protest, and the earth is filled above us in sufficient depth to guard us against ordinary intrusions. We may be certain that none of our friends will come in living flesh to join us, and when death brings them to our side their slumbers will be as long and peaceful as our own. The earth, beneath its surface, is regarded by many, as the dwelling-place of Death, to be contemplated with a shudder, and to be visited only when life has left us.

But have they ever considered how much of life there is which the light of day does not reveal? The plants in our

gardens have their roots in the rich soil prepared for their sustenance; remove those roots, and the plants fall and die. The trees of the forest spread their branches and unfold their leaves to sun and storm, but there are other branches spread below which sometimes extend more widely than those above. Through these lower limbs, hidden from the light of the sun and sheltered from the peltings of the pitiless storm, life comes to the trunk and to the upper branches. Lay bare these lower branches, and tear them from the earth, and the tree soon withers and perishes. The grass carpets the meadow, the flowers adorn the hill-sides, wheat and corn grow in the fields, the trees spread their shading limbs and drop their fruits in their season, and without these the world would be desolate. But all have their existence underground, and they cling as tenaciously to the bosom of Mother Earth as the men who walk among or upon them cling to that mysterious element which we call *life*.

A great portion of the wealth of the globe lies beneath its surface. Gold and silver form the circulating medium of all civilized and many savage people. Their possession is wealth, as the lack of them is poverty: their coming brings happiness, and their departure leaves misery. From the earth they are taken, and in their pursuit men undergo many privations and suffer many hardships. The diamond that sparkles on delicate fingers has been washed from the accumulations which many centuries had piled above it. Iron, copper, tin, and other metals are sought by the light of the miner's lamp, far away from the rays of the sun, and sometimes in long tunnels pushed beneath the ever-restless ocean. Ages and ages ago the hand of Nature deposited beds of coal in every quarter of the globe, and to-day they afford light and heat to millions of the human race. Down, down, hundreds and thousands of feet below the surface of the earth these coal-beds are spread, sometimes over areas many miles in extent, and promising a supply of fuel for many centuries to come. Thousands of men find profitable employment in these mines: and but for their labors, those of us who live above the surface would often suffer the pangs of cold.

As the coal burns brightly in our grates and fills our rooms with heat, do we think of the many centuries it has been awaiting our use, and of the toil that has placed it in our control? As we look at the great network of railways, spreading over our continent, bringing north and south, east and west, nearer together, annihilating time and space (and sometimes annihilating people), do we think that but for the mines of coal and iron our country to-day would be little better than it was half a century ago, and much of its area, now rich in commercial and agricultural prosperity, would be little else than a wilderness? To coal and iron the world owes much of its present advancement, and both these substances come from beneath the surface of the earth.

The most valuable minerals, and those which employ the greatest amount of capital, are of comparatively recent exploitation. Iron has done more good to the world than gold, and is many times more valuable; but gold was known and used long before iron was discovered. Coal is more valuable than copper, and gold, and diamonds; the world could go on without these last, as other minerals could take their places, but nothing now known could take the place of coal. From many parts of the globe the forest primeval has been removed, and countries that a few hundred years ago were thickly wooded are now almost denuded of timber. Should the working of coal mines cease to-day, there would speedily ensue a scarcity of fuel, and, if prolonged, this scarcity would result in much suffering and death. The exploitation of coal is one of the great interests of the British Isles, and is of no inconsiderable importance in the United States. More than two thirds of the mining enterprise of the world is devoted to it: yet this substance, possessing no beauty, and to a casual observer devoid of all merit, is included among the most recently discovered minerals. "Time's noblest offspring is its last."

To most people the underground life of the miner is a mystery. Comparatively few of those who walk the earth to-day have ever been farther within it than to the bottom of a cellar; and in many localities even this experience has been denied to

the inhabitants, for the reason that no cellars are found there. If an enumeration were made to-day of all persons in the United States who have ever been underground more than fifty feet from the surface, and more than one hour at a time, the number would be found surprisingly small. I once accompanied a gentleman from Boston in a descent into a mine a hundred feet in depth, and having a single gallery about eighty feet long, leading from the foot of the shaft. It was an old story to me, but a new one to my Boston friend, who clung to the rope of our bucket as convulsively as a drowning man would clutch a life buoy. When we reached the bottom, and crept along the low gallery, his heart beat violently, and he several times wished himself safe above ground. When we finished our exploration, and returned to the upper air, I asked him what he thought of the mine.

"Most wonderful thing I ever saw," he replied. "I never knew much about mines, and didn't suppose they were so deep. Wonderful, certainly."

"What would you think," I asked, "if I should take you into a mine twenty times as deep as this, and having miles of galleries underground, where you could walk a whole day without going through all of them?"

His face assumed the most puzzled expression I ever saw on a human being, and he was speechless for a full minute. When he regained his voice, he said,—

"You might tell me of such a mine, and I should be obliged to believe you, though I can hardly conceive one could be made so large. But as for taking me into such a place, you could never do it without tying me and carrying me there. Catch me in such a place as that, never."

I told him the story of the boy who went from home for the first time in his life to accompany his father to a grist-mill, about three miles away. When the boy returned, he was thoughtful for a long time, and finally remarked that he never supposed the world was so large.

The miner's life is one of vicissitudes and dangers. He is shut out from the light of day, and depends upon his lamp or

candle, instead of the sun and moon. Shut up in the earth, all is night to him; and whether the sun shines or is obscured by clouds, whether the moon is in the heavens, surrounded by twinkling stars, or the whole dome above is wrapped in darkness, makes little difference to him. All is night, and without his artificial light, all is blackest darkness. The changes that follow the earth's daily revolutions are unknown to the miner as he performs his work, and if he remained continually below, the seasons might come and go without his knowledge. Summer's heat and winter's frost do not reach him; there is for him but one season — the season that has endured for millions of years, and may endure for millions of years to come. The temperature of the surrounding earth, unless varied by that of the air driven to him by the machinery of his mine, or by the heat of his lamp, is the temperature in which he performs his labors. Day and night, spring and autumn, new moon and full moon, may come and go, but they extend not their influence to the depths of the mine.

There are dangers from falls of rock and earth, which may cause immediate death, or enclose their victims in a living tomb. There are dangers from water, which may enter suddenly, flood the mine, and drown all who cannot reach the opening in time to escape. There are dangers from the atmosphere, which may become foul, and leave him who breathes it lying dead, far away from those who would gladly assist him, but would lose their lives should they go to his rescue. His light grows dim, and warns him of his peril; as he starts for a place of safety the light goes out, and in blackest darkness he falls and dies, unless speedily rescued. There are dangers from fire, where the atmosphere becomes charged with inflammable gas; it is lighted by an accident, and an explosion follows, in which dozens and sometimes hundreds of men are killed. There are dangers from fire outside the mine, as in the horrible affair of Avondale. There are dangers from the breaking of ropes, and the derangement of machinery, from the carelessness of those whose duty it is to exercise the utmost caution, and from other causes to be hereafter enumerated.

And yet with all these perils there is no lack of men ready to meet them, as there is no lack of men ready to meet the perils and dangers of all branches of industry. Laborers can always be found for any honest employment, and too often for employment quite outside the bounds of honesty.

The earliest life underground was in caves of natural formation. All over the globe there are caverns where men have lived, sometimes under concealment, sometimes for sanitary reasons, and sometimes because they saved the labor of constructing houses. Some of these caverns are of great dimensions, and could furnish shelter for thousands of men, while others are adapted to the wants of only a few persons. Many caverns and caves are not available as dwelling-places, but are visited only from motives of curiosity on the part of travellers, or from a desire for gain on the part of those who seek whatever may be valuable. Many caves have histories romantic or tragic, and some of them combine romance and tragedy in about equal proportions. Tales of love and war, of fidelity and treachery, and of all the contending passions and experiences of human nature, can be found in the histories of these excavations which have been made by no mortal hands.

Metaphorically, there is a great deal of underground life above the surface of the earth. Men devote time, and patience, and study to the acquisition of wealth by measures that are as far removed from the light of honesty as the tunnel the miner drives beneath the mountain is removed from the light of the sun. One builds a reputation which another burrows beneath and destroys, as the engineers at Hell Gate undertook to destroy the rocky reef which sunk the ships of many a navigator, from the days of Hendrick Hudson to Gen. Newton. Hope springs eternal in the human breast, but it is not always hope for better things.

Dishonest men hope for wealth, they care not how obtained, and in its pursuit they frequently imitate the labors of the miner. Shafts are sunk and tunnels are driven; the pick, the drill, and the powder-blast perform their work; operations are

silently and secretly conducted, and all unknown to the outer world; dangers of falls of earth, of floods of water, of choke-damp, and fire-damp, are unheeded, and by and by the prize may be obtained. A great city, in its moral or immoral life, is cut and seamed with subterranean excavations more extensive than those of the richest coal-fields of England or Belgium. Wall Street is a mining centre greater than the whole of Pennsylvania, and to one who knows it intimately it reveals daily more shafts and tunnels than can be found in Nevada or Colorado. The career of a politician is not unlike that of the miner, though it is frequently much more difficult to follow. The miner may be tracked and found, but there is many a politician whose devious windings would baffle the keenest detective that ever lived.

To describe underground life in its many phases is the object of this volume. The experience of the miner is full of adventures of an exciting character; so exciting, indeed, that there is no occasion to use fiction in place of fact. The hardships, the difficulties, and the dangers that surround him who labors beneath the earth's surface might form the basis of a story more interesting than the most skilfully constructed romance ever printed. It is an old adage, that Truth is stranger than Fiction: the experience of the miner affords better illustrations of the correctness of this adage than does that of any other laborer. Especially is this the case if we consider Underground Life in its metaphoric as well as in its literal sense, and note the devious and hidden ways in which many of our fellow-men pass the greater part of their existence.

[illegible] AT ABOVE THE SEA. THE METROPOLIS OF THE REESE RIVER
[illegible] FIRST DISCOVERED AT THIS POINT IN JULY, 1862.

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II.

DISCOVERY OF COAL.

STRANGE THEORIES ABOUT COAL. — EXPERIENCE OF A SIBERIAN EXPLORING PARTY. — BURNING BLACK STONES. — MINERAL FUEL AMONG THE ANCIENTS. — THEIR SCOTCH POWER. — CHINESE TRADITIONS. — CHINESE GAS WELLS. — HISTORY OF COAL IN ENGLAND. — A ROYAL EDICT. — CURIOUS STORY OF THE MINES OF PLOMEVAUX. — EXTENT OF COAL FIELDS THROUGHOUT THE WORLD. — THE QUAKER AND THE YANKEE PEDLER. — THE FIRST ARTHRACITE. — BELLINGHAM BAY AND THE CHINOOKS. — HOW COAL WAS FORMED. — INTERVIEWING A REPTILE. — THEORIES OF THE ANCIENTS. — RIVERS OF OIL OR VITRIOL. — ANCIENT AND MODERN FIRE WORSHIPPERS.

In the autumn of 1865, a small party connected with the survey of a telegraph route through North-eastern Asia, was landed at the mouth of the Anadyr River, near Behring's Straits. Another party was landed in Kamchatka, and proceeded over land towards the north. They made constant inquiries about the Anadyr party, and at last learned from a band of wandering aboriginals that some white men had been left by a fire ship (steamer) near the mouth of the river, and were living in a small house which they had constructed partly of boards, partly of bushes, and partly of earth. The savages described them as the most wonderful white men they had ever seen. "They have," said one of the savages, "an iron box, and they burn black stones in it to make a fire." These savages had never seen a stove, and they had never seen coal. To their untutored minds the work of the white men was something wonderful.

It is probable that the comparatively recent discovery of mineral coal is due in a great measure to its close resemblance to stone. A savage or civilized man knows that an ordinary stone, whether white, red, blue, green, or gray, will not burn; then why should he suppose that a black stone

will burn? Until a comparatively recent date there has been no great demand for coal as fuel. Many parts of the world at the present day are covered with immense forests, and for a hundred and perhaps thousands of years there will be no occasion in these localities to make use of the mineral fuel.

It is supposed that the Greeks and Romans had some knowledge of fossil fuel, but they made very little use of it, partly for the reason that they did not know the proper way to burn it, and partly because the forests in those days furnished all the fuel needed for industrial purposes. There were no manufactories and smelting establishments, and the working of metals was carried on in a very primitive way. Wood and charcoal were the only fuel, and most of the countries inhabited at that early day were favored with a warm climate, that for the most part of the year was comfortable enough by day, while blankets and other bed-clothing gave sufficient warmth by night. The laws of heat were not known; the pressure of vapor was not even thought of, or suspected; and mechanical force was derived from wind, from water, and from animated beings.

When the winds did not blow the galleys were rowed by convicts, and in the absence of a stream of water, animals, and sometimes men, turned the mill.

Occasionally in building aqueducts, large beds of coal were laid bare, but no attention was paid to them. In making one aqueduct, a branch of a canal was cut through a bed of rock, and at the bottom of that bed a valuable seam of coal was found, but nobody appears to have troubled his head about it. It is supposed by most writers that the discovery of coal occurred in the East. The Chinese have been credited with the discovery and invention of nearly everything in the world except the discovery of America and the invention of the electric telegraph. It is pretty certain that they were acquainted with mineral fuel from a very remote antiquity. They knew how to work it, and apply it to industrial uses, such as baking porcelain, drying tea, and the like. The Chinese, for hundreds of years, used to bake porcelain with

mineral coal. It is only recently that mineral coal has been substituted for charcoal for this very same purpose in France, and it has been found to be quite economical.

The Chinese knew how to collect the gases which came from coal, and they used them for illuminating. The accounts of the early missionaries state that from time immemorial the Chinese used to bore into the earth in search of gas, and when they found it they conveyed it in pipes to the places where it was wanted. Gas was not used for illuminating in Europe until quite recently.

Historians also say that for many centuries mines of coal have been worked in the Celestial Empire, but that the working was in a very barbarous fashion. Many of their coal mines consist of open cuttings; when they went underground they took but little care to construct drains or support the subterranean ways, and they took no precaution whatever against explosions of fire-damp, which often proved fatal. Their working of mines to-day is in the same barbarous fashion of centuries ago, and one might be pardoned for thinking, like the boy who was trying to learn the alphabet, that it was hardly worth while to go through so much to accomplish so little.

In England there are evidences to show that coal was known to the Romans, and possibly to the Britons before the Roman invasion; but it was only worked at the outcrops of the coal seams. No mention is made of coal until the time of Henry II. In 1259 a charter was granted to the Freemen of Newcastle, giving them the liberty "to dig for cole," and a few years later coal was carried to London.

In 1306 Parliament petitioned the king to prevent the importation of coal, and Edward I. issued a proclamation forbidding the use of mineral fuel. Coal was worked to some extent in the thirteenth, fourteenth, fifteenth, and sixteenth centuries, and by the beginning of the seventeenth century the English coal mines were in full operation. In 1615 four thousand English ships were employed in the coal trade. The coal mines of Belgium were opened about the

same time as those of England. The Belgian coal miners tell a curious story of the discovery of coal, in the twelfth century, at the village of Plenevaux, near Liege. One of the old chroniclers gives the account as follows:—

"Houillos, a farrier, at Plenevaux, was so poor as not to be able to earn enough for his wants, not having sometimes bread enough to give to his wife and children. One day, being without work, he almost made up his mind to put an end to his life, when an old man, with a white beard, entered his shop. They entered into conversation. Houillos told him his troubles; that, being a disciple of St. Eloi, he worked in iron, blowing the bellows himself to save the expense of an assistant. He could easily realize some advantages if charcoal was not so dear, as it was that which ruined him.

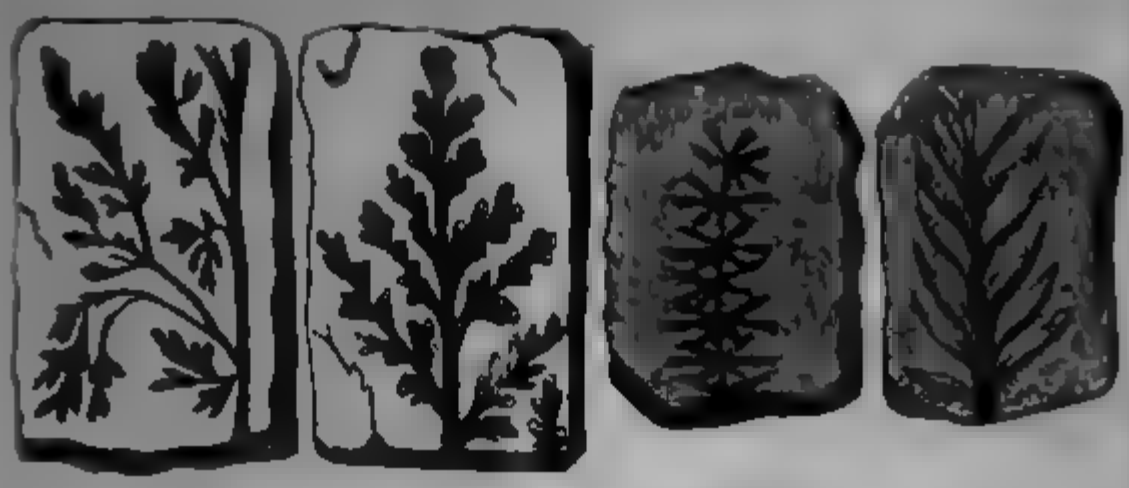
"The good old man was moved even to tears. 'My friend,' said he to the farrier, 'go to the neighboring mountain, dig up the ground, and you will find a black earth suitable for the forge.'

"No sooner said than done. Houillos went to the spot pointed out, found the earth as predicted, and having thrown it into the fire, proceeded to forge a horseshoe at one heating. Transported with joy, he would not keep the precious discovery to himself, but communicated it to his neighbors, and even to his brother farriers. A grateful posterity has bestowed his name to coal, which is called, in French, *Houille*.

"His memory is still cherished by all the miners of Liege, who frequently tell the story of the honest collier, or of the old coal miner, as they delight in calling him. The miners say it was an angel who showed him the spot where the coal was."

It is not positively known when the first discovery of coal was made in the United States. Some historians say that it was before the Revolutionary war, while others say it was since that time. It is certain that coal mining has not been extensively prosecuted on the American continent until within the past fifty years.

There is an old story told somewhere of a discovery of coal in



IMPRESSIONS OF PLANTS FOUND IN COAL.

DISCOVERY OF ANTHRACITE COAL IN PENNSYLVANIA, IN 1768 — INTRODUCED AS FUEL FOR RAILWAY LOCOMOTIVES IN 1829.

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Pennsylvania by one of the Quaker settlers in the mountains, not far from where Scranton now stands. According to the story-teller, — but I cannot vouch for his correctness, — the Quaker settler, who was familiar with coal in England, discovered a peculiar stone, which seemed to him almost identical with the substance which he had used in England for fuel. He carried some of it home, and threw it in the fire. He found that it became red, and was consumed, but that it would only ignite when there was a very hot fire of wood around it. The coal with which he had been familiar would burn quite readily, and gave off a thick black smoke; but the substance which he had discovered gave neither smoke nor flame. He wondered at this, and concluded that the substance which he found was worthless.

One day a traveller, whom the story-teller converts into a Yankee pedler, came along. As they sat by the evening fire, the Quaker told him of the peculiar region they were in, and of the remarkable stones which he had discovered. He threw a few fragments upon the fire, and in a little while they became red and were consumed.

The traveller insisted that the substance was valuable; that it was probably good coal, but the great difficulty was to make it burn. After gossiping a while about the matter, the traveller went to bed.

During the night he pondered over the matter, and in the morning asked his Quaker friend to take him to the spot where he had found the black stone. The spot was shown him: he examined the substance carefully. The Quaker carried to the house a considerable quantity of the substance, and then the Yankee said, —

"I think we can make this stuff burn if we can only draw a fire through it. Now, what we want to do is to fix up something so as to make the fire go where we want it to."

The Quaker assented to the proposition, and asked if it were possible.

The Yankee said, "Yes. I know how it can be done; but before I tell you I want to buy half of the land where you found that stone."

A bargain was struck very speedily, and the Yankee hunted around the establishment, and found a piece of sheet iron, which he fashioned into a blower. He then built up a small, narrow fireplace, and fitted his blower to the front. "The next thing," said he, "is to make something like a grate;" and they took some rods of iron and fashioned them into a rude grate.

"Now," said the Yankee to the Quaker, "build a good fire of wood, so that it will fill the bottom of that grate."

The Quaker followed the directions, and when the fire was well started, the Yankee threw a peck or so of the coal on the top and put up the blower. The fire was drawn directly among the fragments of coal; in a little while the blower was removed, and the coal was found to be a red, burning mass, which threw off an intense heat.

Both were delighted with the discovery; and thus was opened the first anthracite coal mine in America.

A story was once told to me, on the Pacific coast, concerning the discovery of coal at Bellingham Bay, in British Columbia. The narrator said that a party of men connected with the Hudson Bay Company's service, was at one time in the camp of a family of Chinook Indians. The Indians told them that a few days before, in a locality which they had visited, they had attempted to build a fire. The wind was blowing, and in order to shield their fire they piled some stones around it. Among these were two or three large black stones, which they had picked up on the surface. Great was their astonishment, when the fire was under way, to see these black stones ignite and burn. They thought it something mysterious, and immediately ascribed it to the work of the devil, just as a great many savage and civilized people are inclined to attribute anything they do not understand to His Satanic Majesty. Next day they guided the white men to the spot. It was found that a vein of coal outcropped upon the surface, and gave sure indications of a rich deposit below.

The annual production of coal throughout the entire world

is roughly estimated at about two hundred millions of tons. More than half of this coal is produced in Great Britain. About twenty millions of tons are mined in North America, and the rest mainly in Belgium, France, and Prussia. The production of other countries is comparatively insignificant. Coal is the most valuable mineral substance known. The amount of coal taken from the earth every year is double the value of all the gold, silver, and diamonds annually produced. In the great World's Fair of London in 1851, when the famous Kohinoor diamond attracted thousands of curious spectators, there was one day a lump of coal placed near the case containing the Kohinoor. The lump bore this brief label: "This is the *coal* Kohinoor diamond."

America to-day is of far less importance as a coal producer than Great Britain, but she is destined to become eventually the great coal producer of the world. At the present time there is much anxiety in England about the exhaustion in a few hundred years of the coal fields in the British Isles. The United Kingdom contains nine thousand square miles of coal fields; France, Belgium, Spain, Prussia, and other German states, together, about two thousand seven hundred square miles of coal fields; other countries, not including America, contain about twenty-nine thousand, while North America, including the British colonies, contains about one hundred and eighty thousand square miles of coal fields. It will thus be seen that the area of the North American coal fields is four times as great as all those of the other countries of the globe. Of this immense extent of coal deposits, a very small portion has yet been touched, and consequently for thousands of years to come our country can supply the world.

Coal was formed at a very remote geological period. Scientific men differ as to the exact age of this substance. Their differences are trivial, however, being only a few millions of years; but they all agree that at the time coal was formed there were wide jungles and swamps that covered a large portion of the earth's surface. The atmosphere was very moist, and probably contained a much larger proportion of

carbonic acid than at the present time. This gas is one which especially promotes the growth of plants. It is, and was, probably unfavorable to the existence of animal life; and it has been suggested that the gradual withdrawal of the carbonic acid by the growth of vegetation of that period slowly purified the atmosphere, and brought it to the condition in which we now find it. The earth at that time was not fitted for the habitation of man. If man had existed at that period, he would have needed fins in the place of hands and feet, and would have required lungs like those of fishes, instead of those which he now possesses. There was an abundant population of reptiles and of insects, and there was a liberal supply of fishes.

Many of these fishes, reptiles, and insects are unknown at the present day. They performed their work, if work they had to do, and disappeared. Their remains are found in the coal seams and in the rocks which lie above or beneath the coal, and form an interesting subject of study.

Some of the reptiles were enormously large. Remains have been found of a lizard more than one hundred feet long, with an open countenance, that could have taken in an ordinary man about as easily as a chicken swallows a fly. The skeletons of these reptiles are found, and I think that most people who examine these skeletons are inclined to give a sigh of relief when they remember that such creatures are now extinct. They would be very disagreeable travelling companions, and one might be very much disinclined to meet them in a narrow lane on a dark night.

Some years ago I examined the skeleton of a reptile discovered in the Mississippi Valley, and though the bones were cold and motionless, I had the wish to keep at a respectful distance from them. He had a mouth that reminded one of the extension top of a patent carriage; and when his jaw was pushed back, it seemed to me that he could have walked down his own throat without the slightest difficulty.

The most plausible and reasonable theory of the formation of coal seems to be that it is for the most part the remains of vegetable matter which had become decomposed and changed

to mineral on the spot where it remained and is now found. The fibrous tissues of the aquatic vegetation flourished like a thick carpet on the moist surface. It became mingled and matted together, as we now find turf and peat in peat bogs, and in swamps and marshes. On the borders of great lakes, which in time were built up and became swamps, these plains extended, and underwent slow depression. Layers of sand and other substances were carried down below the level of the sea, which we now find among and alternating with the coal seams in the shape of beds of shales and sandstones. Then another system of lagoons formed above them, and allowed new jungles to spring up and new marshes to be formed. These were in turn depressed and covered by the waters. In this way, step by step, the coal beds were built up. According to geologists, each coal seam represents a depressed swamp, while the intervening strata of sandstone, and shale, and clay, mark the various sediments which were brought together by the action of the waters.

The coal beds contain many impressions of plants and portions of plants, so that geologists have been able to determine the nature of the vegetation of that period. There are a great many mosses and ferns, some of the latter having thick, broad stems, and long and heavy leaves. One geologist says there are one hundred and seventy-seven specimens of plants found in single coal beds. He says there are no palms, nor grasses, nor flowering plants; and for this reason he considers that the coal beds were formed from plants of a marshy growth.

The layers of peat, after being covered by shales, sandstone, and limestone, were compressed beneath the enormous weight of the over-lying strata, and while undergoing this compression, there was a sort of distillation and purifying process going on. In this way the plants and peat, orginally loosely matted together, became more and more compressed, and by means of the heat and pressure were entirely decomposed. Ultimately the substance was turned into what we now find it, and the coal was stored up for future ages.

The ancients had curious theories in regard to the forma-

tion of coal. They regarded it as streams of bitumen, which had become petrified, or had impregnated certain very porous kinds of rock. Another theory which they entertained was, that forests had been carbonized on the spot where they grew, or had been transformed by streams of sulphurous acid, which possesses the property of hardening and carbonizing wood. It is easy to attribute the origin of coal to the agency of rivers of bitumen, and oil of vitriol; but it is not easy to say where those rivers came from.

The Chinese have a theory that coal is a species of plant of which the seed was deposited in the earth ages and ages ago, and that it grew and spread in different parts of the empire where it is now found, in order that the Chinese of to-day might have a sufficient supply of fuel. They attribute the streams of inflammable gas, which they collect and utilize, to the breathings of an immense monster below the surface of the earth, and in some localities they call him the first cousin of the God of Fire. The God of Fire is one of the Chinese deities. He occupies a prominent place in the temples, and is worshipped with great solemnity. In other parts of the world these streams of gas are worshipped, and in localities along the coast of the Caspian Sea, streams of burning gas are constantly rising, and their sources are known as sacred wells. They are visited by thousands of devotees every year, and are regarded with the greatest reverence.

Wells of similar character exist in the United States, but they are mostly of artificial origin. They are found in the vicinity of Oil Creek, and that region of Western Pennsylvania which has been baptized as Petrolia. Thousands of devotees have worshipped in the vicinity of these wells, and many of them owe their fortunes to the modern God of Fire; but it is doubtful if many of them worship the wells with that religious devotion and reverence which are found among the fire worshippers of the far east.

A novelty in the way of carrying coal may be seen at the Harewood coal mine, at Nanaimo, British Columbia. The mines are situated at a considerable elevation above the sea-level, and

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WIRE RAILWAY AT THE HARWOOD COAL MINES, BRITISH COLUMBIA.

the intervening ground is covered with trees and rocks, while several deep ravines intercept the grounds. Under such circumstances the construction of a railway would be costly and of great time to make, as several viaducts would be required, and the road at some places would have to make considerable curves. The proprietor of the mines therefore decided to avoid all those difficulties, on putting up a wire tramway in a direct line from the mine to the port, by means of which the coals could be conveyed without expense, and the timber on the ground could be converted into the necessary posts.

There are in all ninety-seven posts, put up to such a height that the wire rope passed over them forms a softly inclining plane. The distance between them is from 150 to 250 feet. The wire rope is of the best cast-steel, specially made for the purpose, and is 6½ miles in length, each post having a pair of grooved pulleys two feet in diameter, over which the wire moves. The rope is driven at the lower end by an engine of 20 horse-power, which is sufficient to drive the line when carrying 12 tons per hour.

The driving machinery is fitted with drums 10 feet in diameter; at the mine the rope simply passes round a 10-foot drum. Two hundred and fifty iron buckets, each with a capacity of 2 cwt. of coal, are fitted with a patent hanger and box-head, by means of which all jolting, when passing over the supports, is avoided. This tramway has been transporting, during eight months, about 120 tons of coal per day, and no accident or stoppage has occurred.

Many other tramways of the same nature have been recently put in operation in various parts of the world, as, for instance, in Mauritius, where they have been successfully applied to the carriage of sugar-cane; also in New Zealand, where they are used for carrying manganesed ore.

This means of conveyance is certainly a very practical and inexpensive one: it does away with railroad material, engines, engineers, the consumption of coal, etc., and may be applied over the deepest ravines, where it would almost be an impossibility to build a railroad, unless a bridge were built, at enormous

expense and labor. Let us conclude this article by giving the following estimate, in round numbers, of the world's present annual production of coal. It is taken from various sources, and may be considered approximately correct.

	Tons.	Per cent.
Great Britain, - -	127,016,747	46.4
United States, - -	50,512,000	18.4
Germany, - - -	45,335,741	16.5
France, - - -	17,400,000	6.4
Belgium, - - -	17,000,000	6.2
Austria and Hungary, -	11,000,000	4.0
Russia, - - -	1,200,000	0.5
Spain, - - -	570,000	0.2
Portugal, - - -	18,000	—
Nova Scotia, - -	1,051,567	0.4
Australia, - - -	1,000,000	0.4
India, - - -	500,000	0.2
Other countries, - -	1,000,000	0.4
	273,704,055	100.0

III.

BORINGS AND SHAFTS.

HOW COAL MINES ARE DISCOVERED — OUTCROPPINGS. — SCIENTIFIC RESEARCHES. — HOW A MARBLE [illegible] WAS FOUND. — BORING A WELL, AND WHAT CAME OF IT. — A LOCAL [illegible] SOCIETY. — INTIMATE RELATIONS OF COAL MINES AND THE STEAM [illegible]. — STRIKING OIL. — "DAD'S STRUCK IT." — THE UNHAPPY MAIDEN [illegible] — COAL INSTEAD OF WATER. — THE TOOLS TO BE USED. — A DEEP [illegible] — TERRIBLE ACCIDENT, AND A MINER'S NOOSENESS. — SINKING SHAFTS. — [illegible] INGENIOUS APPARATUS. — ACCIDENTS IN SHAFTS. — REQUIREMENTS OF [illegible] LAW.

Until the beginning of the present century coal mines were discovered more by accident than in any other way. The coal seams make their appearance at the surface, that is, they "crop out," or "come to grass," as the miners say. Coal on the surface is generally of a poor character, for the reason that it has been for many hundreds of years subject to the action of the elements: but on digging down a few feet, or a few dozen feet, the quality is found to be greatly improved. When coal is thus found at the surface, a preliminary examination is conducted by cutting trenches, galleries, and pits, and if the conditions are favorable, the actual working of the mine can begin. Sometimes the mine is operated by a few cuttings, like the works of an ordinary stone quarry.

Most coal mines have been discovered and opened in this way; but when the coal is concealed beneath the soil, and nothing is observed on the surface, it is discovered by chance, or by geological indications. At the present day many coal mines are discovered by means of railway cuttings, or in sinking wells. Other mines are discovered in this way. Some twenty years ago, while a railway was constructing in Vermont, the workmen came upon a bed of marble, and it was found to be quite extensive. Speculators bought the land in

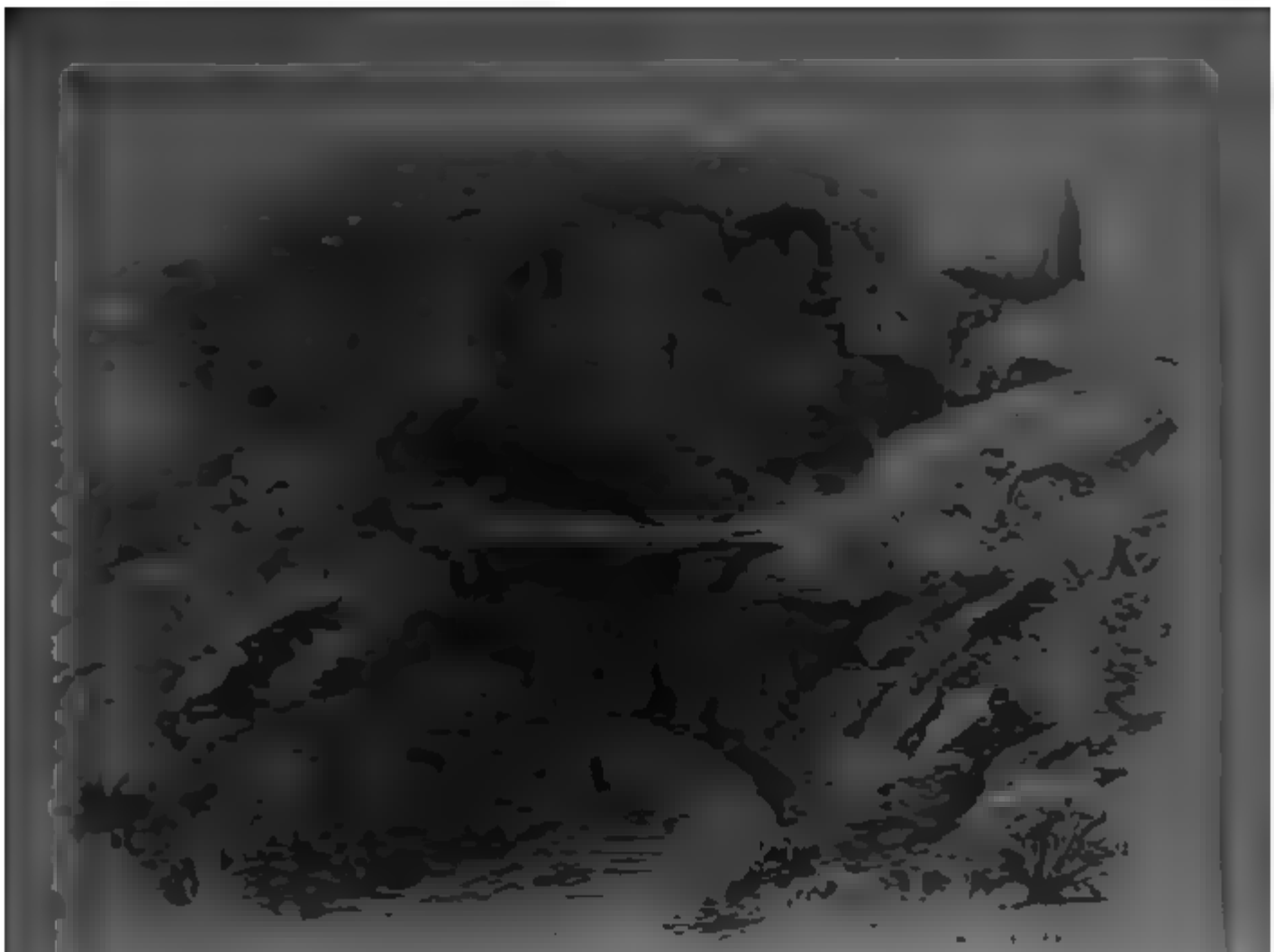
the vicinity, and thus the Vermont marble quarry came into existence.

In 1813 a well was sunk at La Sarthe, in France. Amongst the rubbish a black earth was noticed, which was sent to a provincial debating society at Le Mans. An extraordinary meeting of the society was called, and somebody suggested that this black earth might be coal. It was immediately tried in the stove in the room where the meeting was held, and it was found that the earth burned readily. An investigation followed. Careful examinations were made, and valuable coal mines were opened in the vicinity.

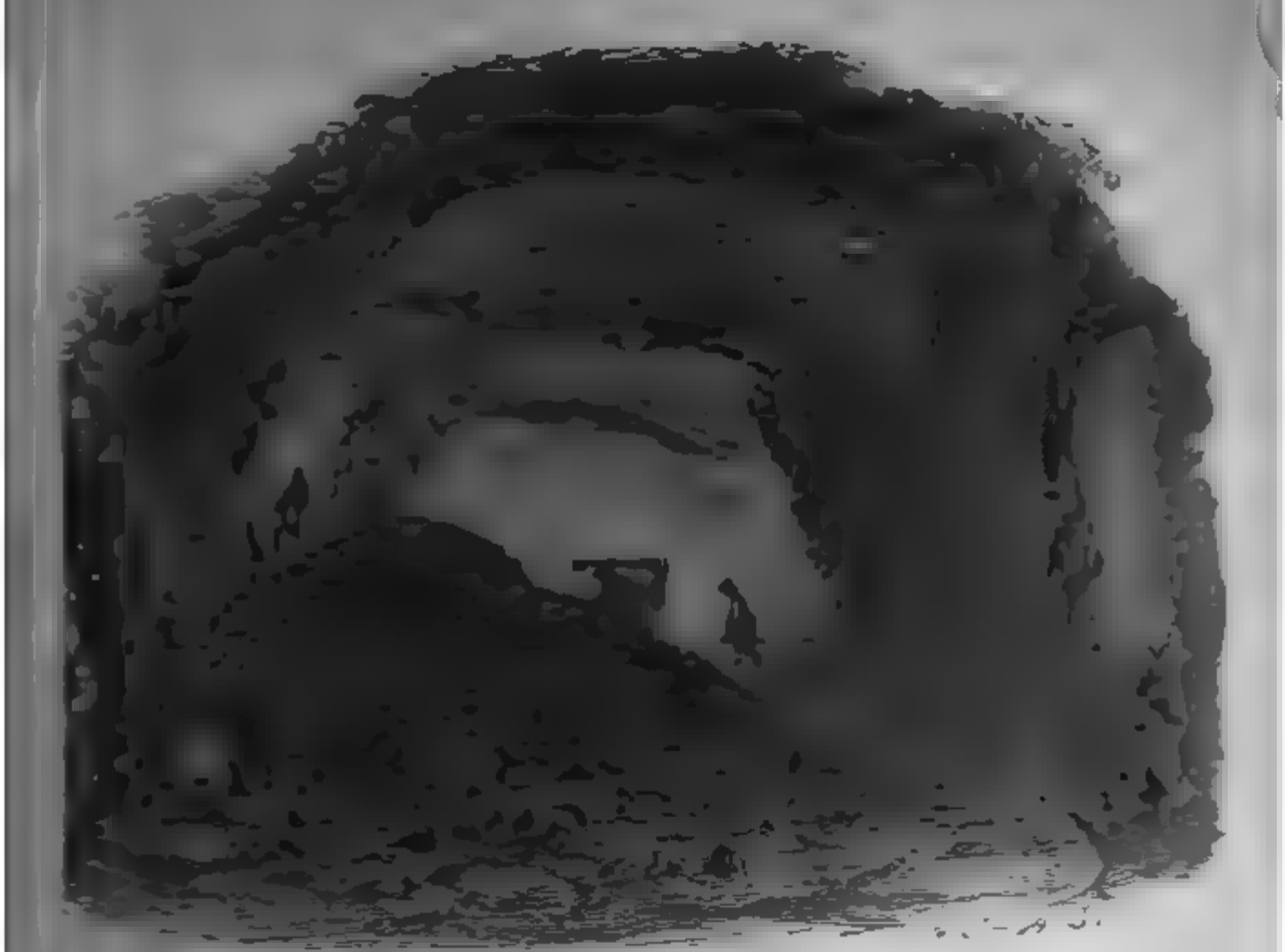
Some of the mines in the United States have been discovered in places where burrowing animals had thrown up the earth. Decomposed coal retains its original blackness; in several instances where it was found in the earth thus thrown up, careful observations were made, and work was immediately begun in search of coal. Some valuable mines have been opened in this way.

Many of the coal mines in France and Belgium, and also in other countries, have been found in consequence of the explorations of geologists. In the year 1716 a very skilful coal miner in Belgium made a series of explorations, and discovered very valuable mines. Under his direction they were explored for several years, but the works were at length abandoned, in consequence of the accumulation of water. In all parts of the world miners have always found great difficulty in proceeding in consequence of the interruptions caused by water, and until the steam engine was invented there was an absence of sufficient power for its removal.

In the eighteenth century deep pits in the Newcastle coal fields were filled with water, and it was necessary to drain these pits before the coal could be taken out. The ordinary pump was not sufficient for the purpose, and a more powerful engine became necessary. Inventions seem to come at a time when they are most needed. When the necessity for a powerful pump was greatest, the steam engine was invented. Savery, Newcomen, and Watt succeeded each other. Captain



ENTRANCE TO A COAL MINE.



DOWN IN A COAL MINE.

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Savery constructed one of his "fire engines" to lift water from one of the Cornish mines; but the power of the engine was not great, and the quantity of water raised was exceedingly small.

Newcomen invented the atmospheric steam engine, in which the piston was lifted by steam, and when this was condensed the piston was forced to the bottom of the cylinder by the pressure of the atmosphere. Afterwards Watt improved upon the engine, and overcame the difficulty of removing the vast accumulations of water in the deep mines, about the middle of the eighteenth century.

There is a curious relation between coal mines and the steam engine. The latter was invented among the former, and without its application to pumping purposes the invention would have been to a great extent worthless, for by means of the very substance raised from the mines the engine is kept in motion. The mines thus furnished the material with which the engine is operated, and only with the aid of the engine can the coal mines be properly worked.

In the petroleum regions of America the borings and pumpings are frequently conducted by means of the gas which rises from the earth. Very often a steam engine is run without any other fuel than a stream of natural gas, conveyed beneath the boiler, and fed through a proper distributing apparatus.

To the coal mine we are also indebted for that great boon of modern civilization, the railway.

Coal is a heavy, bulky article, selling at a low price. Not only must it be removed from the earth, but it must be carried at a cheap rate, and often for long distances. Where there is no water communication the roads are the only mode of conveyance. Originally common earth roads were used, and the coal was carried in ordinary carts. These roads were improved, and, after a time, were in the condition of stone causeways, or macadamized tracks. Afterwards wooden tracks were used, over which the wheels would roll more easily than upon ordinary roads. These wooden tracks were at first placed in the underground ways of the mines, and afterwards extended to the ways above ground.

But wood is not durable; it soon rots and wears away. The wooden tracks were subsequently replaced by others of cast iron; originally these were grooved, but subsequently they were furnished with a lateral flange. Afterwards wrought iron was substituted for cast iron. In the first instance strips of cast iron were placed upon wooden rails, forming the old-fashioned strap rail. Afterwards was invented the ordinary rail as we now find it. The flange was removed from the rail, and placed upon the wheel, and thus, step by step, the modern railway came into existence.

Something more was wanted. Cars were propelled by means of horse or man power. It was necessary to apply the steam engine to the work of transportation. Trefethick, a Cornish miner, constructed a locomotive with a simple boiler, like that of a stationary engine; but the heating surface and the motive power were too small. It was not then supposed that the wheels would turn upon a smooth rail and move forward, and so the driving wheel was toothed and worked in a rack. The speed was less than that of a carriage drawn by horses. George Stephenson, an old coal miner, completed the locomotive.

Seguin, in France, about the same time, invented the tubes which run through the locomotive boiler, and afford a passage to the flames. They greatly increased the evaporating surface, and consequently the production of steam. Stephenson discharged into the chimney the steam which had acted upon the piston, and thus gave a great draft to the furnaces. The locomotive was then complete, and since that day it has only been improved in its details.

We have wandered a little from the search for coal to speak of the steam engine, the locomotive, and the railway.

Many coal mines have been discovered by borings in search of artesian springs. About thirty years ago, in one of the French provinces, a well was being bored, and, quite unexpectedly, the boring tools revealed the presence of coal. As soon as this became known, everybody went to work searching, not for water, but for coal. In a region sixty miles long

ty twelve or fifteen wide, the ground was perforated like a sieve, by a series of borings which were laid down on a plan that seemed to resemble a constellation of stars on a celestial map. Everywhere coal was found, and altogether one hundred thousand acres of coal fields were added to the wealth of France. Nearly thirty companies were organized to work the new mines. Since the discovery about fifty pits have been sunk, some of them to a depth of five hundred yards. In 1851 the mines produced five thousand tons of coal. At the present day their product is not far from twenty millions of tons. All this originated in a search for water.

The process of boring for coal is very much like, in fact almost identical with, boring for petroleum. The boring rods are of wood, or iron, and are screwed together as the work proceeds. The primitive instrument is a steel chisel, or bit, which strikes the rock and wears it away, precisely as an ordinary drill makes a hole in a stone ledge. Boring machinery may be operated by steam power or by hand. In the primitive way, a triangle, or pair of shears, supports the rods, and has an ordinary windlass, by which they may be raised or lowered.

One of the inconveniences attending the ordinary process of boring is, that the rock is pulverized, and nothing but little fragments of dust and mud are brought to the surface. Sometimes it is difficult to determine whether the stones through which the borer has passed are the proper ones to indicate the existence of coal, or whether the black matter comes from coal or shales. All these disadvantages have been overcome by means of a new instrument, which is in general use. A gouge in the form of a hollow cylinder is employed, furnished at the base with a row of teeth, or with several cutting blades of cast steel, and sometimes with a row of diamonds. It is worked like an ordinary borer or auger, and cuts a solid column or cylinder out of the rock as regular in shape as if it had been turned in a lathe.

When this cylinder has been cut to a sufficient length, it is

broken off by means of the gouge bit, or grapnel, which seizes it and brings it to the surface. The boring tool will cut a hole eight inches in diameter, leaving a pillar of rock in the centre which can be broken off at any desired length and brought to daylight. By means of this rock, the fossils in the stone may be studied, together with the structure of the strata, and all its peculiarities. Beautiful specimens of rock are frequently obtained in this way from great depths. Some borings have been made to a depth of nearly two thousand feet, with a diameter varying from eight to twenty inches.

As the boring tool reaches the depth at which the workmen expect to find coal, the operations are conducted with the greatest interest. Every motion of the rod is carefully watched, and when the fragments of rock or earth are brought to the surface, they are examined with great care. When the coal is discovered there is much rejoicing, as it is then certain that the prize has been gained. It is the same in boring for coal as for oil. When a man in Western Pennsylvania has "struck oil," and, according to the local expression, "struck it rich," he feels that his fortune is made. More than one man has thus raised himself above his fellows when his search for coal was rewarded with success. An old story, which has been told many times, and will bear telling a good many times more, is not inapplicable here.

During the period of the first oil excitement in Pennsylvania, a young man, whom the story represents to have been poor but honest, was paying his attentions to a maiden of his neighborhood. The maiden received his addresses, and the pair were engaged to be married. The father of the damsel was an oil seeker, and one day his search for oil was successful. That evening the young man visited his lady love. She received him coldly. He asked the meaning of the coolness, and she curtly replied, "I can't marry you."

"Why?" asked the young man, eagerly.

"Well," said the girl, "I *can't* marry you; dad has struck ile"

The young man went away sorrowing, for he had not great possessions. As the story goes, the damsel, who had been thus suddenly lifted from poverty to wealth in consequence of her father's oil discovery, remained unmarried for several months, but finally gave her hand to an engaging stranger from New York, who dissipated the family fortune as rapidly as it had been obtained.

In 1853 some wealthy gentlemen sought for coal near Creuzot, in France. The spot was carefully selected, and for four years the work went on. The tools penetrated to a depth of more than three thousand feet. This is probably one of the deepest borings ever made. An unforeseen accident stopped the work at that point.

The bore-hole was less than an inch in diameter, and was made by means of a steel chisel fastened into wooden rods, which were screwed together. The boring tool one day became broken at the bottom of the hole. All kinds of grappling implements were lowered to take hold of it, but none of them succeeded. The chisel seemed to be firmly lodged at the bottom, and resisted every attempt to withdraw it. After six months of effort the work was abandoned. One of the parties interested offered to subscribe half a million francs to be given to any one who would invent an instrument that could withdraw the chisel.

Several days after the abandonment of the enterprise, the foreman of the work mounted the staging and made another effort to raise the broken tool. The whole power of the steam engine was exerted in pulling the ends of the rods, when suddenly the rope gave way. The man's hand was caught and crushed between the rod and one of the planks through which it passed. He stood there and shouted to the man to saw off the rod in order to release him. Then holding the remains of the ruined hand in the uninjured one, he walked to Creuzot, three miles away, and without uttering a word of complaint, underwent amputation at the wrist.

After the coal is discovered, whether through surface indications or by borings, the preliminary working begins by

means of a shaft and levels. Generally the first step is to sink a shaft or pit. When the ground is soft, the pit must be walled with brick, stone, or timber, as fast as the descent is made. When the pit is sunk through limestone and sandstone, the progress is slow, but the walls sustain themselves, and do not require either masonry or timbering. A great inconvenience in sinking a shaft arises from springs and small streams of water. In many places where this inconvenience occurs, the shaft is fitted with a wooden lining, or tubbing, as it is called, which is made of thick staves somewhat resembling those of casks, the joints being carefully fitted, in order to keep out all water, and to withstand great pressure. Sometimes this tubbing is made of iron, wrought or cast. Where the ground is loose, or composed of sand and water, the tubbing is forced down from the top, or sinks by its own weight. When this tubbing consists of masonry, it is built in a circle at the surface, and as fast as the earth is removed the masonry sinks. A fresh circle is added at the surface, and thus the work goes on. It was in this way that Brunel constructed the shafts which formed the descent into the Thames Tunnel. Sometimes shafts are sunk under water, and in such case they are lowered in a perpendicular position until the ends strike the bottom, and then the water is pumped out. An ingenious apparatus raises the mud from the bottom, and a pump is kept at work to remove the water.

Sometimes, in sinking a shaft through quicksand, the water runs in faster than any ordinary mode of drainage will remove it. M. Triger, an ingenious Frenchman, invented a machine by which the water could be pumped out. The cylinders of iron were five or six feet in diameter, and he divided them into three compartments, as nearly air-tight as possible. He forced compressed air into the lower one, and enclosed the workman inside. The man was thus in a sort of diving-bell. The compressed air, being forced against the bottom of the shaft, prevented the great mass of water from filtering through the sand. The small quantity which filtered in was, by the force of the compressed air, driven through the sand pipe

communicating with the surface. "Imagine an army of mice," the inventor graphically said to M. Simonin, "and a cat suddenly to make her appearance, and you would have the picture of water reaching the bottom of our shafts through a thousand holes in the ground, if the presence of the air is lowered, and returning suddenly to the surface as soon as the air recovers its tension."

The rubbish and running sands are removed in buckets by hand, or by means of a rope passing through a pulley. Trap-doors communicate from one stage to the other, by means of which the buckets are removed without any serious loss of the compressed air. Shafts may be sunk through quicksands in this way to a depth of eighty or one hundred feet without difficulty. The laborers who pass their time in the compressed air work as easily as in the open atmosphere. Some of them, however, cannot remain there long, especially if they have the drum of the ear very delicate, or are in the habit of drinking to excess. The pressure of air in the chambers rarely exceeds three or four atmospheres.

This apparatus is frequently used for laying the foundation of bridges in the beds of rivers, where there are deep quicksands. The famous bridge of Kehl, near Strasbourg, was constructed in this way, and the engineers say that without some such apparatus the construction of the bridge would have been impossible.

If a shaft has been sunk and properly supported, — that is to say, timbered or walled, — it is generally divided into compartments. The shafts are generally from fifteen to twenty feet in diameter, and consequently there is plenty of space for dividing them. One of the compartments will serve for the tubs, cages, or buckets, in which the coal is raised. Another is for pumps to draw off the water, and sometimes where the miners go up and down by ladders a compartment is made especially for them.

In all cases one compartment in the shaft serves as an air-way or chimney, whether the draft is free or not. In some countries the law requires that there shall be more than one

shaft, or opening, to every mine, while in other countries no such law exists. Many of the owners of mines are abandoning the single shaft system, and gradually supplying their mines with more than one entrance. Many terrible accidents, accompanied by a great loss of life, might have been avoided had the mines been constructed with more than one entrance or shaft. A striking example of this is in the terrible calamity at Avondale, a few years ago. The most approved arrangement of shafts for a large mine where there is explosive gas, and where water is to be pumped, is to sink one shaft for the pumps, another for raising coals, and a third for ventilation. At the bottom of the third one a large furnace is always kept burning.

In some of the mines there may be half a dozen shafts. Those through which the coal is drawn are called the winding pits, those where the pumps are fitted are called pumping pits, those where the men go up and down, are called labor shafts, and those for the passage of air are known as air shafts.

In many mining regions there is a class of pits that have been abandoned in consequence of the coal beneath being worked out. Sometimes these pits are made use of for purposes of ventilation. Proper care is not always taken of these abandoned holes, and they form dangerous precipices, through which a careless person may easily fall and be killed. Strangers strolling in the vicinity of mines occasionally step into these shafts and disappear, to be seen no more alive.

IV.

ACCIDENTS IN SHAFTS.

ADVENTURE OF THE AUTHOR DESCENDING A SHAFT. — A MINUTE OF PERIL. — LIFTED THROUGH A SHAFT BY ONE LEG — A COLLISION IN MID-AIR. — SENSATIONS OF THE DESCENT — A MINER'S VIEWS OF DANGER. — PICTURESQUE SCENE AT A DESCENT. — OFFENDED PRAYERS. — SCENE AT A RUSSIAN MINE. — SAFETY CAGES. — THEIR CONSTRUCTION. — A LUDICROUS INCIDENT. — HOW A MAN FAILED TO KEEP AN ENGAGEMENT. — DOWN IN THE SALT MINES OF POLAND. — A PERILOUS DESCENT. — "PLENTY MORE MEN." — ACCIDENT NEAR SCRANTON. — "PUTTERS." — HOW GIRLS WERE USED IN SCOTLAND. — MAN ENGINES. — THE LEVELS. — AN ACCIDENT CAUSED BY RATS — THRILLING AND FATAL ADVENTURE OF TWO PENNSYLVANIA MINERS — A FEARFUL FALL OF ROOF — CARRYING A DYING COMRADE TOWARD THE LIGHT OF DAY — EIGHT HOURS OF MORTAL AGONY.

My first journey down the shaft of a mine had of course a novelty about it, and also partook of the sensational.

It was not a coal mine into which I descended, but a copper mine. We stepped into a basket suspended by a hempen rope, and our conductor gave the signal to start. The engineer slacked away the rope somehow, and we descended rapidly. It seemed to me very much like falling out of a balloon.

I never have fallen out of a balloon, and therefore cannot say positively whether the sensation was like it or not. I have been up in a balloon, and the sensation of going rapidly upward through the air is very much like that of going rapidly downward into the earth.

Down, down, down we went; and though the time was short, it seemed to me pretty long. I had heard that there was generally at the bottom of the shaft of a mine a pool of water, which is called, in technical language, a "sump."

I had a suspicion that we might be plunged into it, and asked our conductor if there was any danger.

"O, no danger at all!" he replied. "All that can happen to

you is, that if you get into the sump you will get drenched; and then, if you do not like it, you can be drawn to the surface so rapidly, that every thread on you will be dried out again."

This proposed process of wetting and drying did not please me, and I intimated an emphatic hope that the engineer knew his business, and would stop at the proper time.

The descent was not quite eight hundred feet, but it seemed to me at least eight thousand. Every little while we passed a hole, through which the light glimmered, and we could see, though only for the instant, into the various portions of the mine. In one place, a miner was standing at the end of a level, and standing, too, very carelessly on the edge, and we narrowly escaped brushing him off. Had we brushed against him, and thrown him from his perch to the bottom, he would not have been worth three cents a pound after being picked up.

When we reached the bottom, the basket was in a sort of basin, with a flooring of plank just even with its edge. Miners were standing there with lanterns in their hands, or with candles stuck into their hats, and they assisted us to scramble off.

We had sufficient time to get out — or seemed to have; but one of the party, who had crouched to the bottom of the basket, was a long time gathering his limbs together, and picking himself up. He did not pick up fast enough. The engineer waited what he thought was a proper time for us to get out, and then the basket began to move upward just as the dilatory man was putting a leg over its side. As the basket moved up, he was partly in and partly outside, and there was a prospect of witnessing a very pretty accident on his account.

He was a distinguished stranger, and it would never do to have a person of his prominence killed there. Our conductor seized the signal-rope and gave it a violent pull, which caused the engineer to send the basket back again, and wait until everything was ready. The dilatory visitor scrambled out of

the basket, and gave a sigh of relief when he stood upon the planking.

The shaft of a mine is a very good place for accidents. Many of these occur from the carelessness of the miner, or the engineers, and sometimes from their incompetency. By the old system, baskets or buckets were raised or lowered by the winding or unwinding of a rope. Of late years, a cage, travelling in guides, is used, which is much safer than the old system. The miners are careless in consequence of their long acquaintance with the mines. Familiarity breeds contempt, with dangers as with everything else.

The first descent into a mine generally raises the pulse, and very often seriously alarms the visitor. The miners will stand carelessly on the edge of a bucket; but the strangers generally seat themselves at the bottom, and it is sometimes necessary to turn the bucket upside down on reaching the floor of the mine before they can be induced to come out.

The shaft always appears smaller than it really is on account of the darkness. It is never well lighted, and very often the glimmer of the lamps is just sufficient to make darkness visible.

Visitors are always subjects of merriment to the miners. They show more or less fear in all their movements, especially in ascending and descending; but the miners go up and down the shaft laughing and talking, just as the soldier goes under fire and faces the storms of bullets.

The sight of the miners going down is a curious one. The men stand ready around the mouth of the shaft, and at the sound of the bell they crowd into the tubs or cages, or go down the ladders. Their voices can be heard a moment, and then they gradually become fainter and fainter, till lost in the distance. In some mines on the continent of Europe, prayers are offered by the miners before going down; in most mines, however, this is neglected, but many of the men cross themselves on leaving the upper air, and breathe a short prayer to St. Barbe, the great patron saint of the miners.

It is interesting to note the sudden pause in the conversation, to see the hands making the sign of the cross, the lips of

the hardy miners moving, and then, a moment after, to hear them break forth again, and talking as merrily as ever.

I remember, on one occasion, visiting a mine in Russia, where the men gathered at the mouth of the pit seemed engaged in some sort of a dispute. Their voices were loud, and many of the tones were angry. Suddenly a bell was sounded, and in an instant every cap was removed, and every man went through the Russian ceremonial of crossing himself. This ceremony over, caps were restored to the heads of the owners, and the conversation was resumed as loudly and excitedly as ever.

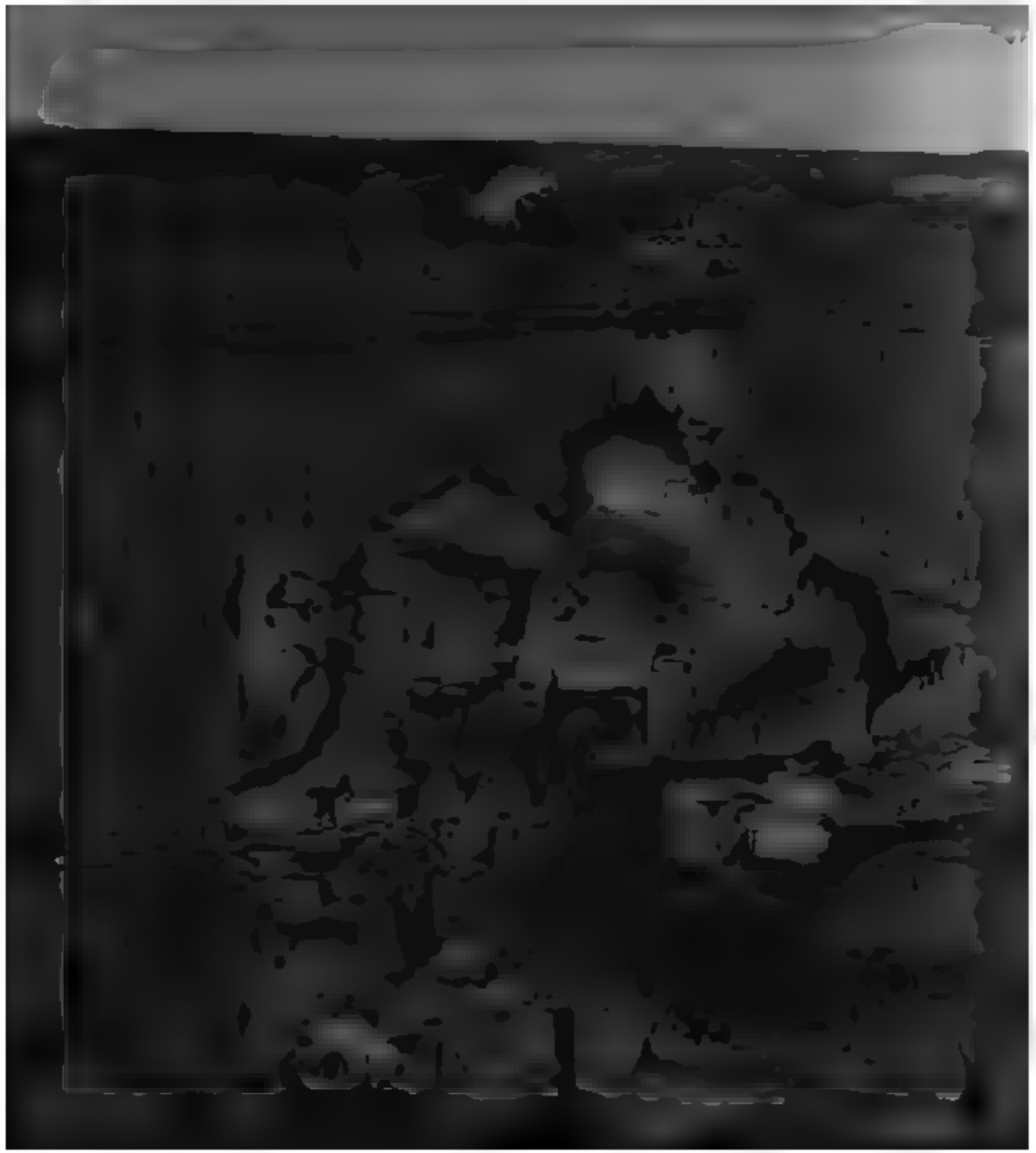
I have seen a soldier standing at his post, as a sentry, when the bell sounded, or the gun was fired, telling the hour of sunset. As the flag descended from the staff, the soldier supported his musket with his left arm, while with his right hand he performed the ceremonial which had been taught him by the church.

The shaft is frequently called the miners' tomb; and it is said that the Belgians have intentionally named it The Grave *(La Fosse)*.

In some mines, so many accidents have occurred in the shaft, that the men never enter it without fear. Great improvements have been made in the mode of ascending or descending, and at the present day the apparatus is considered nearly perfect.

The first improvement for the protection of men ascending and descending, was to cover the tubs with a roof, or bonnet, so that falling materials would injure nobody. Besides this, the heads of the men are shielded by hats made of sheet iron or stout leather. An indicator is kept in front of the engine man, so that he knows precisely the position of the tub; and if there are two tubs in the shaft, one ascending and the other descending, he may know when they pass on their way. In some coal mines the tubs or cages are double-decked, and some of them have four tiers or decks.

The greatest improvement is in the use of safety cages. These consist literally of cages with a strong top to protect



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the persons inside against the stone or other falling substances, and with wooden guides at the side with which the roller wheels of the cages come in contact.

If anything falls, the top of the cage protects the men. If the rope breaks, a spring above the cage is set free, and catches in the guide, bringing the cage to a stand-still suddenly. A great many accidents have been prevented by this contrivance.

Some of the safety cages, instead of wooden guides at the sides, are provided with long, stout stripe of cast or wrought iron. If the rope breaks, a spring at the top is suddenly thrown out, and catches in one of these notches. Safety cages of an improved pattern are in use in many of the principal hotels of America, as well as in mines. They have been manufactured comparatively but a few years. Soon after the Gould and Curry mine, in Nevada, was opened, one of these cages was placed in the principal shaft. The owners of the mine were doubtful of its powers, and the owner of the machine set about convincing them. When everything was ready, he loaded the cage with a ton of stone, then stepped on its top, and standing there suspended several hundred feet above the bottom, he deliberately cut the rope. A shudder ran through the crowd of spectators who were standing around; but their terror was of short duration. The stout springs were thrown out, and the cage did not descend six inches, after the severance of the rope, before it came to a stop.

Ludicrous incidents sometimes occur in these hoisting machines. In one of the hotels in New York, not many months ago, the machinery one day became deranged while the elevator was in use. It was full of passengers, and was between two floors in such a way that nobody could get in or out. It required an hour and a half to arrange the machinery, and in this hour and a half a dozen persons were closely confined in the cage. Such a combination of growls was never before heard in so small a space at one time in that hotel.

It was about half past two o'clock in the afternoon when the elevator stopped. One man had a note to pay before three o'clock. He did not pay it. One lady in the elevator had

left a friend in the parlor, and promised to be down again in five minutes, "as soon as she could arrange her bonnet." She did not keep her promise with her friend. Another man was very thirsty, and was on his way to his room to order up a drink. His thirst continued. And so through all the dozen persons who were detained in the elevator. Every one had an important engagement, or a special reason for being in a hurry, when hurrying was of no earthly use.

In some of the mines of Europe there are neither safety cages, tubs, nor baskets. At the salt mines of Wieliczka, in Austrian Poland, the miners go down at the end of a long rope, to which several loops are fastened. Each loop has a band across it to support the back. The miner seats himself in one of these loops, leans against the band to support his back, clings to the rope with one hand, and holds his candle in the other. Half a dozen men form a bunch in this way, and sometimes there is another bunch above them. At a little distance the groups very much resemble a living chandelier. Not only miners, but visitors, are lowered in this way, and the descent is very trying to a nervous person.

A traveller who went into the Wieliczka mines in this way says he asked if men did not sometimes fall out of the loops. "O, yes," replied the person addressed; "but this is of no consequence. Men are abundant about here, and when one is killed there is always somebody ready to take his place."

Until quite recently, — that is, until the introduction of the safety cages, — accidents from collisions were quite common. Sometimes two tubs of coal are fastened to a rope, not one above the other, but side by side. One day, at a Belgian mine, where they were accustomed to send up the coal in this way, as two men were going down the shaft in a bucket, they came in collision with the ascending coal. Both men were standing, one of them holding the lamp and the other clinging to the chains. The shock of the collision unhooked their tub, and they were left, three hundred feet from the bottom, holding on to the rope. This shock caused the ascending coal buckets to tilt, and large blocks of coal were

thrown out and fell down the shaft. They clung convulsively to the rope, and by a marvellous piece of good fortune, neither of them was injured. They reached the termination of their journey, and the instant that they touched the bottom of the shaft both of them fainted.

Just as one of the same men, at another time, was getting ready to go up the shaft, the engineer started the rope too suddenly. The tub was partly overturned, and the man, with one leg hanging in the tub and with his head downwards, was hoisted nearly a hundred feet up the shaft. By this time an alarm was raised, and they managed to stop the engine and bring the miner back again.

In mines where there are several shafts, there is generally a postive rule against the miners ascending through the pits where the coal is raised. The rule, however, is frequently disregarded, and sometimes the disobedience of the men leads to their death. Occasionally, when the miner is ascending in this way, a lump of coal falls upon and seriously injures or kills him.

At one of the mines near Scranton, not long ago, two miners were ascending in this way, and a block of stone fell from the wall, killing one of them, and injuring the other so that he lived but a few days. In some of the English mines they used to have a system of descent something like the Polish one. Two men were side by side, each of them passing a leg through an iron chain, which was fastened to a rope, and formed a seat. Accidents in this mode of descent frequently occurred, sometimes from carelessness, and sometimes from a man coming in contact with some unexpected obstacle. This mode is never used at the present day, excepting in very shallow pits. Frequently the man would be thrown to the bottom of the shaft and dashed to pieces, full in the sight of his terrified companions, who could not render the least assistance.

In old times coal was taken out of the mines, not by means of hoisting apparatus, but by bearers. Carrying a staff, and with their feet bare, they were obliged every day to carry a

certain number of loads up the inclined road leading to the surface, supporting their burdens on the staff while stopping to rest. The roads were slippery and rough, and the employment was very dangerous.

In some English and Scotch mines, and also in some of the French mines, where the seams of coal are thin, boys, who are called "putters," are employed to draw small carts along a railway. They fasten themselves to the cart with belts around their waists, and draw it along, going sometimes on their hands and feet where the road is wet and rough. Sometimes one of them pulls the cart while the other pushes it. In some of the Scotch mines girls formerly performed this work; but of late the laws do not allow women to work under ground.

Girls used to carry on their backs a basket fastened to a leather strap which passed around their foreheads. A lamp was attached to the strap, and in this way they carried their loads up the long ladders and through the inclines, sometimes a distance of several hundred feet. If a strap broke, a block of coal fell, or a bearer missed her footing, those below were seriously hurt, and many fatal accidents occurred. This primitive mode of raising coal was abolished by law. The owners of the mines had become so careless in regard to the management of their laborers that the government was obliged to interfere.

For the past forty or fifty years movable ladders have been used in many mines both in Europe and America, though less extensively in this country than in the former. In England they are called "man-engines," and are constructed on a principle of reciprocal motion of two parallel rods. The rods are placed about fifteen inches apart, and steps and handles are so arranged as to be at about the ordinary height of a man. By the action of the steam engine one of the rods is raised to a certain height, while the other is lowered for the same distance. During the movement of the crank over its turning point, the miner goes from the step on which he stands to the opposite step. Another stroke of the engine is made, and the

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[illegible] in the opposite direction, and is followed by a fresh movement of the miner. Whether he goes up or down, the [illegible] or descends without any fatigue, and the journey is [illegible] in a very short time.

Many of these engines have been abandoned for the safety [illegible]. The rate at which the men were lifted by them was [illegible] two feet a minute, or a little less time than would be required for ascending by the rope. Another machine in use in Belgium and France is a single rod, and in place of the step there are fixed platforms holding two men each. The length of stroke of the machine is about nine feet, and it will make twelve or fifteen strokes a minute.

The man travelling by it must be very watchful. He must pass from the movable ladder to the landing stage or platform, and watch for a new stroke or step upon the ladder. To avoid accidents he must use great caution, and no hesitation. The slightest embarrassment may cause a very serious accident, and the sudden return motion may kill the traveller on the spot.

From the bottom of the shaft of a mine the men scatter in various directions to their work, or are distributed among the different levels. A shaft is perpendicular, while the level is horizontal. The dangers in the shaft have already been described. Strictly speaking, no dangers of the same sort are liable to occur in the levels. True, there may be falls of rock or coal, or whatever other substance forms the roof of the mine; but they generally occur in consequence of the carelessness of some person on the same level, and not above or below.

Levels are described by their names, though they are not always in a strictly horizontal position. Sometimes they dip at considerable angles, owing to the formation of the rock, or the position of the substances to be mined. They are made of various heights, though generally of not more than six feet. The materials used for lining the shaft — that is, brick, timber, or stone — are likewise employed in the levels, and the modes of strengthening in both cases are very nearly the

same. Where the work is intended to last more than six or eight years, it is generally set up with stone, and not timbered. Where it is intended to last a long time, and especially if the rock through which it runs is of a yielding nature, it is strongly arched with masonry.

Sometimes it is necessary to make an arch below as well as above, for the reason that the flooring of the mine is apt to swell up in consequence of the pressure from below. Masonry used in levels is very much like ordinary masonry, and requires no especial description.

For timbering levels there are three timbers—two uprights and a head-piece. Sometimes there is a fourth piece, placed at the bottom, known as the sleeper, or sill. This is used, however, only when the flooring is soft, or consists of a substance that is apt to bulge up.

The pressure from above, as well as the lateral pressure, frequently bends and breaks the timbers. This bending and breaking of the timbers, occasioned by the settling of the earth, are rarely sudden in their occurrence. At first there will be observed a slight bending of the timbers; the next day the bending will be seen to be greater; and sometimes a month, or even six months, may pass before the timbers are sufficiently curved to break. Frequently levels that have been made five or six feet in height will, in the course of a few months, be reduced to a height of not more than three feet. The timbers will be bent around in all directions, and it requires considerable nerve to pass between them.

Where the mines are moist, the timbers soon become covered with fungus, and a vegetable peculiar to the interior of the mine makes its appearance. Sometimes it is not unlike light cottony material; occasionally it is snow-white, and again like tanned leather, or of a bright yellow color. The timber, when rotting, has an odor like that of creosote, and is familiar to everybody who has passed any time in deep mines.

Rats abound in mines, and are frequently very numerous. They make themselves at home, and are as comfortable as possible. While the miners are at their dinners, they frequently

play around them, and appear on friendly relations with them. Occasionally, they become so hungry that whenever a candle is placed in the wall, and the miner's back is turned, the rats will rush forward and seize the prize at the risk of being burned.

Sometimes rats are the cause of accidents. Some years ago an explosion occurred at a mine in Wales, when several men lost their lives. There was one pit which was known to be full of explosive gas, and the men were warned to be very careful of their movements with their lamps. A lamp, in which the glass was surrounded with iron netting, was placed on a shelf in the part of the mine where the men were at work. The miners were a few yards away, when they noticed half a dozen rats clambering about the lamp, and saw them tip it over. It fell from the shelf and struck a lump of coal. A hole was made through the wire gauze, the lamp was broken, and a terrible explosion of gas followed.

To the here-related accidents, we feel obliged to add a thrilling and fatal adventure of two Pennsylvania miners, which occurred in the vicinity of Scranton, Pa., on the 23d of April, 1877. —

In calculating the cost of coal, there is one important item which is never taken into consideration by capitalist or consumer, and that is the loss of life and limb incurred in the work of digging "dusky diamonds" and preparing them for market. A glance at the list of deaths and accidents published monthly in the local papers, is sufficient to send a thrill of horror through the stoutest heart; but familiarity soon makes us partially indifferent to such matters, and it is only when some thrilling calamity occurs, such as the Avondale or West Pittston disaster, that we are fairly aroused to the perils incident to the work of mining.

We know but little of these things, unless we see an occasional account of it in the newspapers, and even then we can but faintly realize the mishaps that befal, from day to day, in the way of fire-damp explosions, falling roofs, and the innumerable other death-dealing agencies that lurk in the depths of the coal mine.

One of the most heart-rending accidents of this character which has been recorded for some time, has just occurred at the Empire mine, in this vicinity. Two men, named John Mooney and Patrick Quinn, were employed in No. 4 slope, laying track, a distance of about two miles from the opening, and a mile from the other workmen. When they least dreamed of danger there was a sudden convulsion overhead, and an instant later they were overwhelmed by a fearful fall of roof. The terrible accident put out their lights, and they were in utter darkness. Mooney, after considerable difficulty, succeeded in extricating himself from among the massive bowlders which fell about him, in such a way as to form a sort of cave. and, upon freeing himself, his first thought was for his companion. He called aloud for Quinn, but received no answer, only the echo of his own voice, beaten back by the rocks. He felt himself growing faint, and realized that he was very seriously injured, but was determined to ascertain the condition of his fellow miner. After calling aloud in vain for some time, he groped about in the dismal place among the rocks, hoping to find Quinn, and fearing that he was dead. At length he touched him, but the poor fellow was pinned fast by a big bowlder, which lay upon one of his mangled legs. The other leg had been completely severed from the body by the fall. To release him was a hard task, but Mooney, forgetting his own injuries, set about the work with a will, and suceeded in setting Quinn free.

How to carry him to the light of day was the next trial, but he was determined to do it; and taking him upon his back, he began groping his way through the pitchy darkness, in the direction of what he considered was the foot of the slope. For two hours he wandered about that living tomb, with his dying comrade on his back, moaning in the most piteous manner. The situation was awful, and, after roaming thus for a long time, poor Mooney was disheartened to find that he had come back to the very point from which he had set out, and where the accident occurred. He summoned up his fast-fading strength and made another effort, still taking Quinn on his

back; but, after proceeding a short distance, he grew faint, and was unable to go farther with his precious burden. Then, laying the dying man down in as comfortable a position as he could, Mooney crawled on his hands and knees toward what he thought was the slope. At half-past six o'clock a party of miners, while proceeding down No. 5 slope, were startled by the apparition which their lamps revealed. It was Mooney, crawling slowly up the slope on his hands and knees, his face black and bloody, and his whole body sore from contact with the jagged pieces of coal and rock. His eyes were at first dazzled by the light, he had been in darkness so long, and trying to see, and he was speechless with joy for some seconds to find relief at last.

This was eight hours after the accident had happened, and they were eight hours of awful mortal agony. As soon as Mooney found words to speak, he related the story in brief, and begged the party to hasten to the assistance of Quinn, who might yet be saved.

They hurried to the spot indicated, and found the unfortunate fellow in the condition already described, with one leg severed from his body, and the other crushed to piece[illegible]. He was still alive, and they took him up in their arms to carry him to the slope, but he never reached it alive. He died in the arms of his comrades. Mooney, who is severely wounded, is expected to recover. He played the part of a hero in the unselfish manner in which he risked his own life trying to save his comrade. But such acts are not of rare occurrence among the miners. They are a most unselfish, brave lot of fellows, and will face death in the mine at any time to save one another. The men who met Mooney crawling up the slope were moved to tears, by his haggard, woe-begone and saddened looks, and say they never saw such a pitiful sight before.

V.

SILVER MINES AND MINING.

ANTIQUITY OF SILVER. — REAL ESTATE AND SLAVE PURCHASES IN BIBLICAL TIMES. — SOLOMON AND HIS SILVER SPECULATIONS. — ABUNDANCE OF SILVER AMONG THE ANCIENTS. — THE EARLIEST MINES. — ORIENTAL EXAGGERATION. — SPANISH MINES AND THEIR HISTORY. — MEXICAN MINES. — A NONDESCRIPT ANIMAL. — NOVEL WAY OF OBTAINING A PIGSKIN. — PERU AND ITS SILVER. — A HIGH-TONED CITY. — ARIZONA. — BEAUTIES OF ARIZONA CIVILIZATION. — MINES OF UTAH AND NEVADA. — SAD RESULTS OF A SPECULATION.

ONE of the most important of the precious metals is that known as silver. The ancients were familiar with it, and from very early periods it has been a common medium of exchange, and is used as such among all nations who recognize a metallic currency. It is one of the metals mentioned in the Old Testament, reference being made to it as constituting, among other things, the riches of Abraham. Abraham made a real estate transaction by purchasing the field of Ephron for four hundred shekels of silver. Twenty-nine pieces of silver were paid for Joseph at the time his brothers disposed of him and gave a bill of sale; and throughout the Scriptures there are many other references made to the same metal.

Those who have given attention to the subject think that gold was first known and used as money, partly for the reason that it is more frequently mentioned in the earlier histories, and also from the fact that gold is obtained in a metallic state, while silver must generally be separated from ores in which the metal is concealed. The Egyptians and Hebrews were familiar with gold and silver, and employed them both as a circulating medium, and for the manufacture of jewels, vases, rings, and other articles for household or

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present use. The oldest known coins are of silver, though there are gold coins of nearly as great antiquity.

It is a little curious that the ancients possessed silver in greater abundance than people of the present day. It is possible that the old historians drew the long bow a little in estimating it, and due allowance may be made for their statement. In the time of King Solomon, silver is said to have been so abundant as to be considered of very little account, and the king had made it to be as stones in Jerusalem. Polybius says that it was largely employed, together with gold, in the form of plates for covering the beams and pillars of the temples, and the tiles upon the roofs were of solid silver. Other historians, both sacred and profane, speak of its great abundance, and some of them are so liberal in the use of adjectives, as to lead to the suspicion that they were not to be wise trammelled by existing facts. Oriental exaggeration has no doubt something to do with their stories.

At the present day, in certain parts of the East, a statement is rarely made exactly as it should be, according to Western notions. Thus a man, describing a fine house, would not convey a proper idea of its character if he described it exactly as it is. If he should say that the house covered a square mile in area, was half a mile high, contained two thousand rooms, each of them so full of furniture that nobody could get inside the door, and that the household consisted of nine hundred servants; he would merely convey to his hearers the impression that the house was somewhat above the common order of houses, and nothing more.

Bayard Taylor, in one of his books, describes an interview with a certain prince or titled individual from one of the interior kingdoms of Africa. The prince, in describing the wealth and resources of the kingdom of Dahomey, said that the king never walked out unless accompanied by at least ten thousand attendants, and that when he chose to ride, forty thousand horses were led to the door of his palace, from which he could make his selection. He continued in the same strain, and when he had finished his story, he asked

a question in regard to Mr. Taylor's country. Mr. Taylor replied, that the United States were so large that it took two years to travel from one end of the country to the other; that it required six weeks of rapid riding to go round the walls of the capital; and that our Sultan, who was called the President, had a wardrobe of sixty thousand coats, from which he made his selection to dress himself for breakfast. In this manner each person conveyed to the other the proper idea of the country, and nothing more. The prince substantially informed the American that Dahomey was a rich country, and the king powerful; while the American, on the other hand, informed the prince that America was a very large country, and that the president's wealth was personal, rather than national.

But we are getting away from silver, a substance which it is not desirable at any time to see far from us.

The locality of the ancient silver mines is buried in obscurity; but it is known that silver was obtained, together with gold, from various parts of Africa, and also from Asia. The Spanish silver mines were developed at a very early period, and were the basis of the extensive commerce which Spain conducted for a long time with other countries. Hannibal is said to have opened a mine which furnished three hundred pounds of silver daily, and was worked by horizontal tunnels extending a mile and a half into a mountain. During the middle ages the production of silver fell off very greatly, and until the fifteenth century comparatively little silver mining was carried on. The production of Spanish mines was greatly decreased, and the wealth of Spain fell off in a proportionate degree.

Rich mines of silver existed in the new world, particularly in Mexico and Peru. The conquest of Mexico by Cortes in 1519 was speedily followed by the development of the rich silver mines of that country. From a very early period the Aztecs had been familiar with silver, and wrought it into many ornamental and useful articles. The mines were opened and extensively worked by the Peruvians in Guanajuato, Zacatecas, and other districts, and their production was greatly

increased by the abundance of quicksilver, and its employment in the reduction of ores. Quicksilver is used for this purpose to a greater extent in Mexico and Peru than in other countries.

At the time of the visit of Humboldt in the early part of this century, it was estimated that three thousand distinct mines were in operation. The greatest of all the mines of Mexico are those of Guanajuato and Zacatecas. They were opened in 1558, upon the great vein known as Veta Madra. The great vein is chiefly in clay slate. It is of wonderful thickness, sometimes more than one hundred and fifty feet across, and is said to have been traced for about twelve miles.

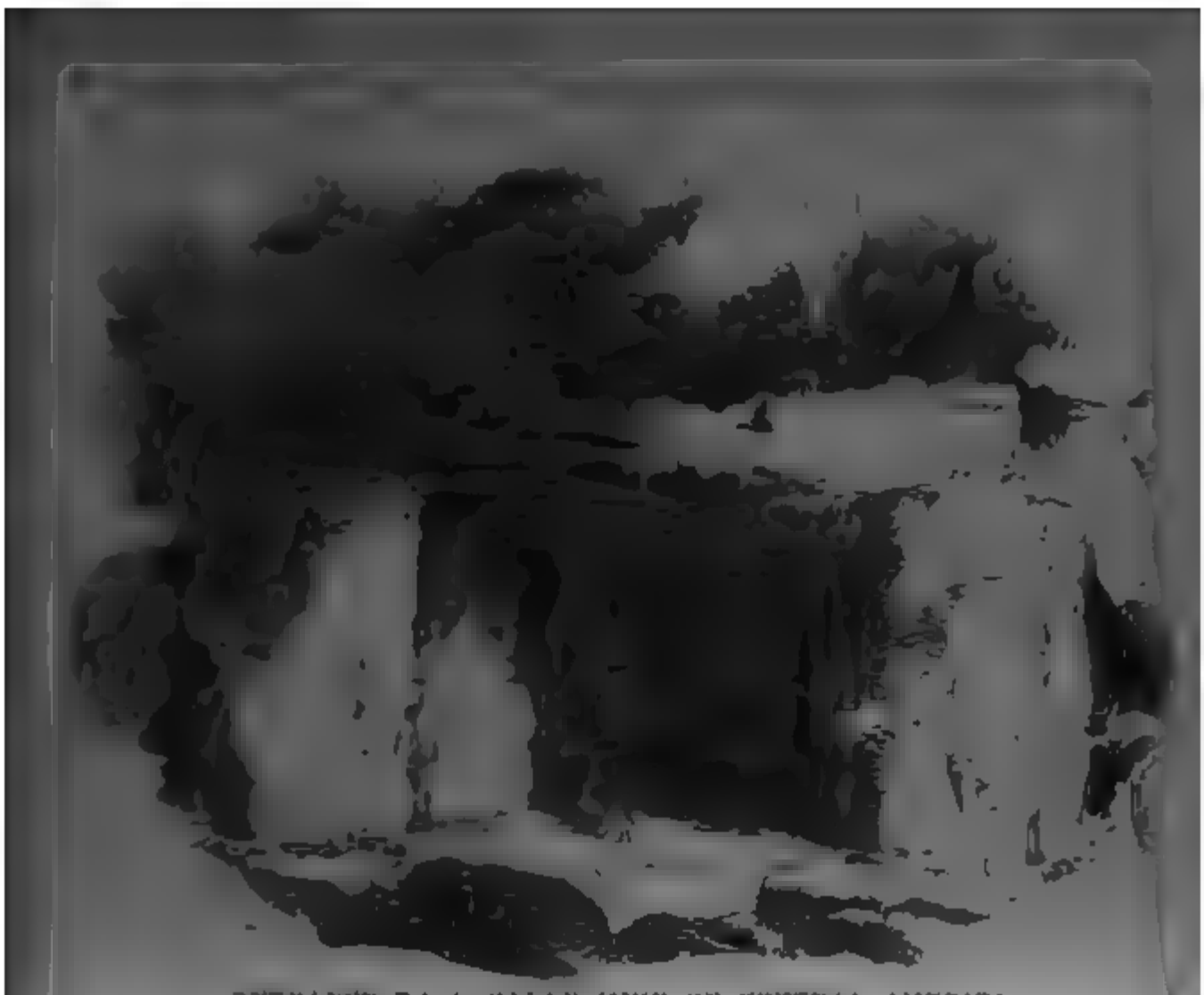
The vein is made up of half a dozen substances, the most important of which are native silver, sulphuret of silver, and red silver. Near the surface they are partly decomposed, but in their unchanged condition, farther down, they are known as "black ores." The vein has been penetrated downward more than two thousand feet, and is found to be very rich at that depth. The mine of Valenciana, upon a rich portion of this vein, has averaged at times a product of two million dollars, or about one fifteenth part of the total product of all the mines of Mexico. At the present time no work is carried on in those mines. Operations were suspended some years ago by floods of water, and the unsettled state of the country, added to other disadvantages, prevented a renewal of work. Before any productive operations could be prosecuted, it would be necessary to erect powerful machinery; and to set it up and put it in operation would cost enormously; so great, in fact, would be the cost, as to deter any body of men, or any association of capitalists, from entering upon the enterprise.

Until the present century the ores of the silver mines of Mexico have been worked by rude processes, very little in advance of those of the native Indians. Little or no mining machinery was used. The ores had to be transported out of the mines upon the backs of Indians, climbing up a series of long steps over slippery rocks, and working in a nude state.

When the mines were troubled with water, rude pumps were set up, and in many cases there were no pumps, but the water was carried out on the backs of men.

A traveller who visited one of these mines, where operations on a small scale were going on, says the sight of the men carrying their burdens, some laden with ore, and some with water, formed a curious picture. The ore was carried in sacks or baskets slung across the shoulders of the men, while the water was carried in pig-skins. These skins were in the natural shape of the animal, and were supposed to have been removed without cutting. When slung over the shoulders of the men in the dim light of the mine, the man and the pig clinging to his back appeared to form a single animal. An unsophisticated traveller, who accompanied the narrator, was curious to ascertain how the skins were obtained in that condition, as the ordinary mode of skinning pigs, oxen, or any other beasts requires a liberal use of the knife. He was informed that the animal was starved for several days, so that his skin became quite loose. Then a stout cord was tied to his tail, and by this mode he was securely fastened to a tree. A potato or an ear of corn was then held a few feet in front of his nose, and the pig was finally coaxed out of his skin, and induced to walk away from it. The man seemed to have his doubts as to the truth of the statement, but finally concluded to accept it as correct.

In 1821 the Mexican government offered facilities for foreigners to become interested with the natives in the mines. Several English companies were formed, and operations were undertaken upon a new system, in order to work the mines with powerful machinery, and with all the advantages of capital and mining skill. In nearly every instance these operations were unsuccessful, partly owing to the enormous expenses attending the management of a silver mine in Mexico, and partly owing to the dishonesty of the natives in official and private capacities. Whenever a mine yielded handsomely, the government surrounded it with absurd restrictions, or old titles were discovered to it, that made the claims of the new occupant valueless.



ENTRANCE TO A SILVER MINE OF CENTRAL AMERICA.

INDIAN SILVER MINERS AT WORK.

The English capitalists and gentlemen who went to Mexico were scalped and wearied out in a few years and returned with unpleasant recollections.

At the present day nearly every foreigner who visits Mexico engages in a business enterprise has very nearly the same story to tell. The instability of the government naturally causes insecurity, both to life and property; and where the property is that of a foreigner, it is not very likely to be regarded with great respect.

From the opening of the Mexican mines, in the sixteenth century, their production of silver has exceeded that of all other countries. From the annual yield of two or three millions of dollars, it rose, in the eighteenth century, to twenty millions, and continued so for about ten years of the present century, when it was changed by the war of independence. It remained at a low rate until 1850, when it again increased, and in 1856 it was not far from forty millions.

Latterly, as already stated, the product has been greatly increased, and accurate statistics are very difficult to be obtained in regard to it.

The total product of the Mexican mines from the time of the conquest by Cortes up to the expulsion of the Spanish in 1827, is said, according to official records, to have been considerably more than two thousand millions of dollars. The silver mines of Northern Mexico, near the boundary of the United States, are supposed to be very rich; but the disturbed state of the country prevented their successful exploitation.

Mining operations to some extent have been carried on in some of these districts, and in Arizona, but under many disadvantages.

Arizona is a delightful country in every respect, except in climate, soil, production, and inhabitants. The natives have a pleasant way of slaughtering every stranger who attempts to stay there; and sometimes, when they refrain from their amusement for a few months, the strangers fall to killing each other.

Until very recently it was said that no white man had ever

died in Arizona with his boots off, — meaning that he had never died in bed. The cemeteries at two or three settlements in Arizona are said to contain no graves except those of persons who had died violent deaths at the hands of either white men or Indians. The Indians make travelling very insecure; and the Peons, or native Mexican laborers, in the mines vary the monotony of their employment by an occasional massacre of the superintendent and every other white man about the place. I was at one time acquainted with a superintendent who had twice escaped assassination by reason of accidental absence. He did not take warning by his luck on these occasions, but continued on in his usual way till on the occurrence of another conspiracy he was killed.

Closely rivalling the mines of Mexico are those of Peru. They are scattered in various parts of the country, but the richest and most famous are in Potosi, formerly belonging to Peru, but now a part of Bolivia. The story is, that these mines were discovered in 1545, by an Indian hunter, who accidentally exposed lumps of the precious metal in the roots of a bush which he pulled from the ground. His discovery led to careful and extensive explorations, and in a short time the city of Potosi sprung up in a barren and almost inaccessible district.

Potosi is among mountains generally of volcanic formation, and more than five thousand mines have been opened in its vicinity. The country is barren, and much of it is more than ten thousand feet above the level of the sea.

The city of Potosi is more than two miles up in the air; that is to say, more than two miles above the sea level. It has a population at the present day of less than fifty thousand, though it contained at one period more than three times that number. It has been repeatedly shaken by earthquakes, and in some of these earthquakes a great many people have lost their lives. All supplies must be brought from a distance, as the country in the immediate neighborhood produces absolutely nothing.

It is not a beautiful place of residence, and those who

dwell there ... to the production and preparation of silver.

An idea of the richnes... be formed, when it is known that betwee... 18 ... the mines of Potosi alone yielded nine hund... d ... nty ve million dollars' worth of silver.

Silver mines are pretty... ike in ... ts of the world. They are also not much ... mi ... ot ... metals. They are opened by shafts, tun... d the like, the same as other mines, though each locali... so ... processes of operations peculiar to itself. The o... y ...thods of separating silver from its ores are based e... r upon forming an amalgam of the metal with the mercur... or in bringing it into combination with lead, and afterwards separating it. The ores of Mexico and Peru are treated by both processes. Some of the richest ores are picked out and thrown into the furnace. The amalgamating process, which was long used in the silver mines of Mexico and Peru, and is still generally practised there, was invented more than three hundred years ago. The ores are crushed by stamping machines, and then ground with water, in machines called arastras, a sort of circular mill, run by mule power. It is ground to as fine a condition as possible, and, after being allowed several days to dry, is spread out in circular heaps, about fifty feet in diameter and a foot in depth. To every ton of this substance three bushels of salt are added, and the whole is then carefully mixed. A chemical substance, of a coppery character, is then added, and a sort of fermentation takes place, in which great heat is thrown out. Quicksilver is then added, in small quantities at a time, and crudely mixed in, until the whole mass forms an amalgam. The whole process occupies from four to six weeks. The amalgam is then separated from the mass of ore by a system of washing similar to that practised in collecting gold. The mercury is then separated from the amalgam by the ordinary process of evaporation, and in the same manner as if removing it from gold.

Sometimes silver is found in masses which are nearly pure;

but this is very rarely the case. The largest quantities have been discovered in the copper mines of Lake Superior, and in some of the mines of Norway and Saxony. Some of these masses exceed five hundred pounds in weight, but ordinarily they weigh but a few ounces or pounds.

Specimens of native silver are frequently found in the beds of rivers, very far from any other deposits of this metal. The richest mines of this metal, at the present day, are in the United States, particularly in Nevada and Utah. The great Comstock lode has already been referred to. In November, 1859, the discovery of silver mines at Lake Washoe became known, and in the following year the products of the mines were sent out in such large quantities as to lead many people to suppose that the commercial value of silver would be greatly cheapened.

Mines have been opened in various localities throughout Nevada, but the richest of them, and, in fact, almost the only ones, of any great value, are on the Comstock lode. Its ores are very rich. The vein is of unusual width, and it has made fortunes for a great many men, and, on the other hand, has taken fortunes from a great many others. Some of the most extensive mining speculations ever known in California have been in these mines. Their value has greatly fluctuated; in some years the product has exceeded twenty millions of dollars, and the price of shares in the mines increased accordingly; then the product would suddenly fall off, and down would go the stock. Sometimes dividends would be made every month, and suddenly they would be followed by left-handed dividends, or assessments. In San Francisco a single day has witnessed the reduction to beggary of men who at sunrise could boast of considerable wealth; the following day might witness their return to wealth, or the return of others to poverty. Nearly all the men who made money in Nevada a few years ago, and did not kill themselves by riotous living, are now poor, and have a brilliant prospect of remaining so.

ONE METHOD OF WASHING FOR SILVER.

ANOTHER METHOD OF WASHING FOR SILVER.

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VI.

SILVER MINING IN NEVADA.

HOW GOLD WAS DISCOVERED IN NEVADA—A PECULIAR "BLACK SAND," AND WHAT CAME OF IT—SILVER CURSED AND THROWN AWAY—ACCIDENTAL DISCOVERY OF THE VALUE OF THE ORE—H. T. P. COMSTOCK—THE COMSTOCK LODE—HOW MINING RECORDS WERE KEPT—YIELD OF THE NEVADA MINES—BONANZA AND BORRASCA—THE BIG BONANZA—THE GRAVE OF THE DIGGERS—"WASHOE ZEPHYRS"—PAY ROLLS OF THE MINING COMPANIES—INTERESTING DETAILS.

Probably the most remarkable silver mines of the world are those of Nevada. It is difficult to estimate, with absolute accuracy, the amount which has been taken from them. They were only recently discovered, and the story of their discovery is quite romantic.

Very naturally, the gold miners of California drifted over the Sierra Nevadas, into the great Utah basin, in search of gold. During 1850, and the following years, gold discoveries were made on the eastern slopes of the Sierras. The first discovery was made by some Mormon emigrants, who were on their way to California; the snows had not melted upon the mountains, and they were compelled to camp, for some time, on the Carson River. They had no expectation of gold, but simply went to prospecting by way of killing time. They did not work very long at the business, but continued their journey to California as soon as the season permitted. Other emigrants coming along from time to time, continued the work, and by 1852 there was quite a mining population along the Carson River and its tributaries. None of them made large fortunes, but most of them did well.

None of them had any thought of silver, and they knew so little about silver ore that when they found it, they were igno-

rant of its character, and cursed it as a nuisance. They found a heavy, worthless sand, looking like pulverized iron, that settled upon the quicksilver in their rockers, and prevented the amalgamation of the gold. The gold was not of a fine quality, as it was mixed with a considerable quantity of silver. For a considerable time, the miners worked on, and it is said that some of them had regular hours, which were devoted to swearing at this black sand, which was continually in their way. The gold in the placer mines of California was worth from sixteen to nineteen dollars an ounce, while the gold taken along the Carson River was worth not more than eleven or twelve dollars.

In the spring of 1859, quite a party of miners was at work in what was known as Six Mile Cañon. They lived at Gold Hill, where a small village had grown up, not far from their working place. There was a scant supply of water, and they concluded to made a sort of reservoir by digging a hole, and turning the small stream into it. They located this reservoir a little way above the place where they were working, and after digging about four feet, they found what afterward proved to be the decomposed silver ore of the now famous Comstock lode. They did not find silver, at least, they did not know that what they found was a deposit of black sulphuret of silver, which was nothing more than the pure metal in a decomposed state.

They concluded to try some of this curious looking dirt in their rockers. It yielded well. They found that they were digging out gold very rapidly, but they were puzzled as to the character of the dirt containing it. They pushed on further and further into the vein, and taking the lumps that were left on the screens of the rockers, pounded them up with hammers and in mortars. So rich was this substance, that one man was able to take out one hundred dollars a day.

The party consisted of four men, one of whom was H. T. P. Comstock, an adventurer who had wandered about the Pacific coast for years, and had never accomplished anything of importance. There was some dispute as to the title to the

location, but it was finally agreed that there should be an equal division of the land in the lode. Very soon it became noised about that the miners had "struck it rich," and there was great excitement in regard to the new digging. A notice was recorded, claiming the ground on the lode, and the land around it.

The names which were recorded in this notice were Peter O'Reilly, H. T. P. Comstock, Patrick McLaughlin, J. H. Osborne, and E. Penrod. This location was the famous Comstock lode, which has since yielded so many millions.

Gold mining was carried on there for some weeks after the location of this claim. A gentleman familiar with the history of the discovery, says that as soon as Comstock obtained a position in the party, he elected himself superintendent, and did all the heavy talking. He was conspicuous on all occasions, and very soon was considered not only the discoverer, but the originator of the lode. Work was diligently pushed, and for weeks the miners dug the rich decomposed silver ore, washed the gold out of it, and let it go to waste, throwing it anywhere to get it out of the way. It was an intolerable nuisance, and it is safe to say that those miners swore about it to an extent greater than is recorded of "our army in Flanders." It gave a certain unpopularity to the diggings, on account of the inconvenience it caused. It was worse than the black sand that everywhere abounds in gold mines, because that does not interfere with the amalgamation.

Comstock was a free-handed, generous fellow, having very little regard for his own money, or that of anybody else. It was the custom, in those days, when a lady visited the mines, to offer her a pan of dust, and to take it from the richest part of the lode. On one occasion, several ladies visited the mine, and the usual courtesy was offered. It was so arranged that they obtained one hundred and fifty dollars or more for each pan. The last of the ladies was young and pretty; Comstock wished to be polite, and so, while her pan was being passed out, he slyly dropped a handful of gold in it. The result was that her prize amounted to more than five hundred dollars.

Many tons of the black sulphuret of silver were washed away, until, in the month of July, 1859, a man named Harrison visited the new diggings, and took a piece of the ore away with him, as a curiosity. Being in California, shortly afterwards, he gave this curiosity to a gentleman in Grass Valley, Nevada County. This gentleman carried it to be assayed, and it was found to yield at the rate of several thousand dollars per ton.

Harrison said that there were tons and tons of the stuff lying around in the mine where this was taken out, and so it was determined to keep the matter a secret, to go as speedily as possible and obtain possession of the place. Everybody was sworn to secrecy, and of course everybody told his intimate friend. The result of the assay was known late one night, and by the next morning, everybody in Grass Valley knew all about it. Two of the men were off before daylight, and in a few days hundreds of people were *en route* for Washoe.

The discovery created great excitement. The news spread rapidly throughout California, and all sorts of people, who could get away, and many who could not, proceeded immediately to Washoe. Washoe was the sensation of the day. The population increased with magical rapidity. The whole country around was visited by prospecters, who laid out claim after claim, staking out the whole region, and the most extravagant stories were told concerning its wealth. The mining recorder had a busy time of it, and took in a great many fees for his work. The book of records was kept at a drinking saloon, and lay upon the shelf behind the bar. Anybody could consult it who wished to, and if a man made a location, and was not satisfied with it, he would proceed to alter the record to suit himself. The result was that dates and places in the book were very much altered, and it is difficult to understand many of the claims.

Curious stories are told of the sharp practices of the miners and the lawyers they engaged. It is said that during a mining suit in those times, there was a controversy about a stump which was understood to mark the boundary of a certain claim.

The lawyer on one side one afternoon produced several witnesses who said they could swear to the stump and its location. Next morning, the jury proceeded to the spot. It was found that the stump had been removed during the night, and the whole ground around was so carefully leveled and covered with loose rock, that its former position could not be ascertained.

Gold mining was carried on as before, after the value of this blue stuff had become known. It was no longer thrown away, but was carefully gathered up and put in sacks and barrels for transport to San Francisco. Comstock never made a fortune out of the discovery. He sold out his interest for ten thousand dollars, most of which he never received, and wandered off in another direction. He had numerous infelicities of varied character, and finally died, in 1870, in Montana.

Prices were high, for some time, at Washoe, owing to the immense immigration, and scanty supply of provisions. It is said that in the early part of 1860, hay was worth fifty cents a pound, and barley forty cents. As it was too expensive to keep horses, many of the miners shot them, or let them wander off in the hills and die of their own accord. Flour was worth seventy-five cents a pound, coffee fifty cents, and bacon forty cents. Lumber was worth two hundred dollars a thousand, and other things were held at proportionate prices.

The community was not the most orderly in the world, and fights were of frequent occurrence, so frequent that they became monotonous. The weather was not altogether tropical in its character. There were frequent sand and rain storms, in the spring, and settlers became acquainted with what is known as the Washoe "Zephyr."

This "Zephyr" is a wind that blows down from the mountains, at irregular and unexpected intervals, and, as one of the residents expressed it, "has no nonsense about it." A man from that region once described it to me as follows: "You may think you have seen wind some times, but you haven't until you go to Washoe. It takes the roof off of houses; it will blow a donkey five miles over a mountain; and it will shave

the hair off the back of a bull-dog, if it happens to take him tail-ways. That 'zephyr' is the reason so many men in Nevada have lost their hair. A bald man has a good chance with it. A fellow with a good thick crop has no show at all. When the 'zephyr' comes, the air is full of sand, tin roofs, cats, old boxes, furniture, wagons, anything and everything. It makes no difference. The only way to save yourself from being blown off is to lie down on the ground and take hold of something, and hold on there until the 'zephyr' is gone."

The first mine upon the Comstock lode was known as the Ophir. The first shafts that were sunk were merely round holes of no great depth, and not constructed upon scientific principles; but as the value of the mine became known, shafts were built in a scientific manner, and lined with timber. The first hoisting apparatus was the common hand windlass. That gave place to the horse-whim, and that, again, to steam machinery. The first of the latter which was put in was during the year 1860, and was a common fifteen horse-power engine. By the end of 1860, the mine had reached a depth of nearly two hundred feet. The vein of rich ore was found to be forty-five feet wide. Nobody had ever seen such a width before, and the miners were at a loss for means to support the roof above. They sent to California for an experienced engineer, and after his arrival, it took him several weeks to arrange a suitable plan.

He arranged a system of "timbering in square sets," which is still used in all the mines of that region. Timbers were framed and kept together in the shape of cribs, which can be carried up to any desired height. If the vein is wide, the cribs are filled with waste rock, which forms pillars of stone, and thus supports the mines. In 1861, an engine of forty-five horse-power was put in, with an eight inch pump and some improved machinery for hoisting purposes. This was thought to be frightfully extravagant at the time, but, compared with the present machinery, it is a most insignificant affair.

It may be well to explain, here, the meaning of the word which has now become incorporated into our language, "bo-

nanza." It is a Spanish word, meaning, practically, "in good luck," or rich bodies of ore. Opposed to it is the term "Borrasca," meaning "in bad luck," or in barren rock. There are always, in the Nevada mines, some companies which are working in Borrasca, while others are working in Bonanza, and the great advance and decline in the values of the mining stock is due to this fact. When a company is in Borrasca, its stock is low: in Bonanza, there is a very rapid advance. In the latter part of 1870, an immense bonanza was found in one of the mines. A few months before this discovery, the stock of the mine sold at three dollars per share. A few months afterward, it sold for $1,825 per share. Another mine, whose stock had sold, previous to the discovery of the bonanza, at a dollar and a half a share, rose to $1,525. During the excitement growing out of the discovery of this "big bonanza," the increase in the mining stock on the Comstock lode was nearly fifty millions of dollars.

The mines on the Comstock lode have swallowed millions of feet of lumber. It is estimated that not less than eighty million feet are annually lowered in the mines, never to be returned to the open air. In a single mine, six million feet are consumed annually, and at the same time, about two hundred and fifty thousand cords of wood. For miles around, the mountains have been stripped of their forests, and the country presents a wild and barren appearance. Nearly all the mountains within fifty miles of Virginia City have been thus denuded. Fuel has become so scarce and dear that search has been made for coal, and it is now extensively used as fuel, though, at present, it costs nearly as much as wood.

An idea of the extent of the mines may be formed by a glance at the pay rolls. On the first of every month, over half a million dollars are paid out to the employés. Of the principal companies, the Consolidated Virginia pays $90,000, Crown Point $90,000, Belcher $65,000. There are several whose pay rolls average from $20,000 to $30,000 per month, and many companies whose figures exceed $10,000. Then, in addition to this, are the wages of the men employed in the

mountains, cutting timber, and bringing it to the mine, and for other kinds of work.

The yield of the Comstock vein, in ten years, is estimated at two hundred and twenty millions of dollars, or an average yield, annually, of thirteen millions, seven hundred and fifty thousand dollars. In 1874, the yield exceeded twenty-two millions, and in subsequent years it was larger.

The mines have been subject to the usual accidents of similar works in all parts of the world. Many men have lost their lives there, from falls through the shafts, from the breaking of cables, from falls of rock, and various other causes. The mines have been on fire several times, the gases generated from the earth assisting the burning of the immense masses of timber. The heat in the mines is, at all times, very great, and consequently the wood becomes exceedingly dry, and liable to ignite at the slightest opportunity. Some of the fires are attributed to spontaneous combustion, but it seems more probable that they are the result of carelessness. Virginia City, which stands above the mines, has also suffered very greatly from the same cause, and on one occasion, almost the entire settlement was swept away, involving a loss of millions of dollars.

But in spite of accidents, calamities, the rise and fall of stocks, Washoe "zephyrs," and other things, the work goes steadily on, and the mines of Nevada, year after year, continue to hold their place as the greatest and most remarkable silver mines in the world.

During the month of April, 1877, the shipments of the California mine have been $1,600,000. If we read the brief announcement, every month, on a certain day, that a certain mine has paid a dividend of $1,080,000, we have not the slightest idea of what is necessary to be done in order to make such an announcement possible. Every one who ever owed a note in a bank, knows that thirty days is a very brief period of time. To cause a mine to produce $60,000 in a single day, is a tremendous feat; to continue this product daily, through weeks and months, almost without variation, is

a marvel. It takes forethought, endurance, judgment, and nice calculation, such as very few men possess in this world. The ore from which this mighty yield is extracted, has hid away almost a third of a mile below the earth's surface. It lies where consuming heat and baffling waters join their forces to try and drive away the invading miner. While the ore is being hoisted, every month, 1,250,000 feet of lumber has to be lowered and put in position, to keep safe the weakening caused by the mighty excavations. While one level is being worked, another has to be explored, for a drain of 500 tons of ore per day would soon level a mountain down. Then the Comstock is an uneasy fissure. In a single week, sometimes the swell of the ground shivers into splinters fourteen-inch square timbers. Shafts and drifts and inclines and tracks have to be watched incessantly, for a mine, like a glacier, seems ever to be working. This is all below ground. Above the surface is a world of machinery, always to be kept in order—steam engines, air engines, cables, cages, air pipes, pumps, and all the multiplied devices intended to expedite the work and lessen the dangers of mining. Five hundred men have to be lowered into and hoisted from the depths daily. Three hundred cords of wood have to be provided daily for fuel. And there must be no delays, no serious accidents. The needed repairs must be anticipated and provided for; the accidents must be anticipated and guarded against; the explorations must be carried on months in advance; the supplies must never fail. A vast space of forest land, thirty miles away, has to be denuded of its timber, yearly, to fill the insatiate maw of this one mine. It requires 15,000,000 feet of timber, and 100,000 cords of wood, annually, to supply the mine, and to furnish fuel to hoist and reduce the ores. How many can appreciate the ability necessary to carry on this work without any mistakes? Many a man of mind sufficient to accomplish the feat, would fail through sheer lack of physical strength. The work means being up at five o'clock in the morning; means two or three daily journeys into the depths, and when anything unusual happens, it means standing guard

day and night, like a ship's captain in a storm, until the trouble is over. It means a mind large enough to take in the immense work going on at a glance, yet careful enough to include its smallest details, and exact enough to anticipate the wants of the enterprise months in advance. For ten months, the California mine has monthly given up this tremendous yield.

The following list of the bonanzas of the Comstock will be interesting to all who are watching the marvelous history of that mammoth vein:

1. Ophir and Mexican.—Discovered on the surface, and extended 500 feet in depth. Average width of ore, 15 feet; cubical contents, 112,000 tons; approximate value of ore, $22,000,000.

2. Gould & Curry.—Extended from the surface to the depth of 500 feet. Average width of ore, 15 feet; length along the vein, 500 feet; cubical contents, 190,000 tons; value of ore, $37,500,000

3. Savage.—This was a continuation of the Curry bonanza, but not so rich. The ore continued down in the Savage claim to the very bottom of that mine, which is now 2,300 feet below the outcroppings.

4. Hale & Norcross bonanza.—This body was struck at a depth of 450 feet. It averaged 10 feet in width, was about 200 feet long, and stretched down to the 1,200 foot level. Cubical contents, 75,000 tons; value, $5,500,000.

5. Chollar Potosi bonanza—struck at a depth of 500 feet; width of the vein worked, 100 feet; has extended with but few interruptions down to the present bottom of the mine, which is over 1,700 feet. Cubical contents, 1,500,000 tons; value, $24,000,000.

6. Gold Hill bonanza.—This body extended from the surface to a depth of 500 feet, and for 300 feet on the vein. Contents, 300,000 tons; value, $10,000,000.

7. Yellow Jacket bonanza.—Discovered on the surface, and extended downward for over 700 feet. The ore on this body was quite poor, and never yielded much profit. Its total production was about $5,000,000.

8. Kentuck bonanza—300 feet long, 20 feet wide, and 400 feet deep. This ore was very rich. Contents, 100,000 tons; value, $10,000,000.

9. Crown Point and Belcher bonanza.—Discovered on the 1,400 foot level, and extended downward for 600 feet. Is still producing in the Belcher. Contents, 1,500,000 tons; value, $50,000,000

10 Consolidated Virginia and California bonanza.—This last and greatest ore body which the lode has yet developed was found by drifting eastward from the 1,500 foot level into what was supposed to be the last country rock The bonanza lies above and below this, and is believed to contain $140,000,000. It extends for about 700 feet along the vein, is 600 feet in height, and nearly 100 feet in width. Up to the present date, it has yielded over $30,000,000, though discovered less than two years ago, and is now producing at the rate of $120,000 per day.

The Comstock now furnishes employment for over 2,000 miners. Its daily output of ore is nearly 2,000 tons, and its yield, for the year 1877, will approach $50,000,000. One-half of this (or, more correctly, about forty-two per cent.) is gold, and the balance silver. When the amount of ore now in sight is taken out, the lode will have produced in all something over $300,000,000 in precious metals.

VII.

SPECULATIONS IN NEVADA MINES.

MINING SPECULATIONS. — SWINDLERS IN NEW YORK AND BOSTON. — THE AUTHOR'S EXPERIENCE. — HOW HE WAS CAUGHT. — THE HOOK AND THE WAY TO BAIT IT. — LIMITED INVESTMENT. — THE ADVENTURER'S STORY. — FACTS AND FIGURES. — THE ROMANCE, AND THE SUBSEQUENT REALITY. — ONE HUNDRED PER CENT. A MONTH. — IRISH DIVIDENDS. — EXPLOSION OF THE BUBBLE. — THE VICTIMS AND THEIR FATE. — NANKEEN TROUSERS IN WINTER. — AN ADVENTURER'S EXPERIENCE IN LONDON. — HOW HE CAUGHT A CAPITALIST. — HELD BY THE GLITTERING EYE.

AMONG the various mining operations, there are many in which there are tunnels, and levels, and shafts of a metaphoric as well as of a literal character. This is peculiarly the case in our great cities: copper mines on Lake Superior, gold mines in Colorado and California, silver mines in Nevada and Utah, iron mines in Pennsylvania and elsewhere, have been exploited, in many instances, much more successfully in New York and Boston than at the places where they are located, or supposed to be located. In many instances, the mines which are sold have no existence whatever; millions of dollars have been paid in New York, Boston, Philadelphia, and other cities, for mines which had no existence, or next to none.

Some years ago, it was my fortune to become infected with the silver mining fever. It was at a time when speculators from the far West and the Pacific coast were abundant, and their operations upon the credulous and unsophisticated natives of Manhattan Island were wonderful to behold, and became disagreeable to remember. What poor innocents we were! I had had some experience with gold mines, and other mines, and I knew, or ought to have known, that honesty did not abound among their manipulators to any alarming extent.

SPECULATORS AT THE MINES.

DEMONSTRATING THE VALUE OF A SILVER MINE.

MINES AND MINING ON PAPER FAMILIAR SCENES

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Most of those who came to New York with mines for sale were men of pleasing, though rough exterior, and their tongues were as flexible as the hair-spring of a watch. They could talk the ears from a donkey without moving a muscle, and the strangest part of it was, that the donkey would, generally, lose his aural appendages without knowing it. He would listen, and would deliberate, and, like the lesson who deliberates, he would be lost. His hand (on the supposition that a donkey possesses hands) would go down to his pocket, and he would place the money — whether honestly or dishonestly acquired nobody knew — into the hands of the beguiling speculator; and the speculator thereupon would retire to the fastnesses of his hotel, and waste the substance of the verdant New Yorker in riotous living.

I was introduced to one of these adventurers, who owned a silver mine of wonderful richness. Figures were exhibited, and a plan of the mine was spread before us: it was a gorgeous parchment. The mine, with its dips, and spurs, and angles, was carefully delineated.

There was a picture of a crushing mill in full operation, and there was all the machinery portrayed on that parchment for running a first-class mine. A dozen of us were invited to meet the speculator the next day in a cosy little office where we could see specimens from the mines.

The speculator was there at the appointed hour. We came, we saw, and *he* conquered: there was a fortune before us.

"Gentlemen," said the speculator, "this is the finest mine within forty miles of Frogtown." Frogtown was the name of the city nearest to the great mine; I believe he called it the Revenue mine — good name, that, to enterprising men who wanted to increase their revenue.

"Gentlemen," he continued, "before this mine was discovered a good many people around Frogtown talked of moving away, but as soon as it was opened nobody wanted to leave. The population has increased a thousand per cent. in three months, and it will continue to increase quite as fast; in a year from now we will have a population of fifty thousand,

and we can employ three thousand men at least in and around the Revenue. I won't sell the whole of it, gentlemen; you have not money enough in New York to buy the whole of this mine; but what I want is to raise money to develop it. There is a mine there worth a hundred millions of dollars, at the very least; but you see it may be worth millions of dollars, and at the same time it will want money to develop it."

"I don't exactly understand," said I, "why you came all the way to New York to get money if the mine is so rich."

"Why, the thing is very plain," said he; "the people that came there have a use for all their money. Money is readily worth twenty-five per cent. a month at Frogtown, and it is hard to get it at that; men can do so much better there.

"I have in mind, now, a man who came there over six months ago with two thousand dollars; he has invested it in such a way that it is returning him four thousand dollars a month. Any man who knows anything about the business there, will readily put in his money where it will make him a fortune: it is the best place in the world for investing money."

"That does not answer the question," said another: "why can't you get the money in some place near Frogtown, from people who know about your mine, and know how rich it is? and, any way, if you have so valuable a mine, why do you want to raise money?"

The Frogtown adventurer smiled a sarcastic smile, as if amused at the ignorance of the questioner. The smile was brief, but convincing, and gave full weight to the statement which followed it.

"Suppose now," said he, "that you are in a house where you had a clear title to anything you discover. Going through the cellar of the house, you find an iron chest: you strike that chest, and you are sure you hear money rattle inside of it. You attempt to lift it, but find it too heavy: now what do you want to do? Plainly you want to open the chest; but it is firmly locked and is very solid. You look around for some implement with which you can break it open, but nothing of the sort can be found. There may be other men standing around,

but nobody among them has any tools that will help you. You look all through the house, but not a tool can be discovered: plainly you must go out of that house to find something that will help you to get at your money.

"Now, that is exactly the fix that we are in: our mine is the money chest, Frogtown is the cellar, and Nevada is the house. To open that mine, to make the shafts and to get the machinery, we must have money. The silver is there, plenty of it: but before we can put it into the market we must dig it out and refine it, and that is exactly the position. Your money chest will be of no use to you until it is opened, neither is the mine of any use until it is at work. You might have a property worth a million of dollars and not have a shilling to buy your breakfast with."

He repeated that winning smile, and we were convinced.

He continued, "I will not sell the whole mine for all the money in New York, but I am ready to put it into a stock company, and sell half of it for sixty thousand dollars; and as soon as the money is paid in, we can go to work and develop the mine. It will return you, gentlemen, a hundred per cent. a month on your investment, and it will begin to pay dividends within three months, and the dividends, gentlemen, will be paid in coin, dollar for dollar."

This was better still; gold was then at a high premium, or, what amounted to the same thing, greenbacks were at a heavy discount. Twelve hundred per cent. a year in coin was something not to be despised. We thought we ought to get more for our investment, but were willing to begin at that rate.

We made up the company, and were only allowed to put in one thousand dollars each. The speculator was a philanthropist: he wished to benefit as many as possible of his fellowmen: he would not consent that so great a blessing should be enjoyed by a few. "I want," said he, "as many men as possible to have an interest is this matter. I want to show everybody that I am dealing fairly and honorably; and to satisfy you that everything is correct, I have plenty of references."

He mentioned several gentlemen more or less well known.

Among them was one who, by a lucky circumstance, was in the very building where we were assembled. He was sent for, and came to our meeting.

He confirmed all that had been said by the rosy-lipped speculator; in fact, he confirmed a great deal more than had been said by the latter. Our thoughts, as we listened to him, were like those of the Queen of Sheba when she looked at the bank account of King Solomon.

We hastened to pay our money and secure our shares of the greatest silver mine of this or any other age. In a few days we obtained the certificates of our stock. They were beautiful specimens of the lithographer's art, and nearly as large as a first-class morning newspaper. Of course there could be no doubt of the genuineness of an undertaking that was set forth on certificates like these.

Time passed on; that is to say, a few weeks passed on. We visited the office of the company every day or two, and heard nothing but the most glowing accounts. We heard daily of unfortunate and grief-stricken individuals who had been left out in the cold, who were seeking frantically to obtain some of the Revenue stock, but found, to their sorrow, that none was to be had. Each of us had invested his one thousand dollars, and was not allowed to invest more. Those miserable beings who had not been in on the ground floor, and were anxious to buy, were offering, — so we were told, — a hundred per cent. advance for shares, but none of us would sell. We scorned to double our money when we should soon begin to receive every month an amount equal to our investment. Never did a bull-dog cling with more tenacity to the under jaw of another bull-dog than we clung to the stock of the Revenue.

But soon our picture of coming wealth began to lose its brightness. Our first dividend was an Irish one. As soon as the sixty thousand dollars were paid in, we were told that the sixty thousand dollars had gone for the purchase of the mine; that is to say, our half interest in it. Thirty thousand dollars were now needed for the purchase of a mill. Of what use *would* be a mine without a mill?

We admitted the force of this reasoning, and, not without much grumbling, we raised the money to purchase the mill. With the innocence of toothless and milk-imbibing infants we supposed that the purchase of a mill would put our mine in a paying condition.

The mill was bought, and then we were told that money was required for transporting it from San Francisco to Frogtown. About that time I began to see a hole through the ladder, and concluded there was a large-sized cat in that beautiful meal tub. I determined to send no more good money after bad money, and refused to pay any more assessments.

Some of my friends, however, who had gone into the enterprise, determined to stick to it. They paid the money on their share, or as much as was required for the transportation of the mill. When this was done, there was a call for more money to purchase a steam engine. Then the confounded engine had to be transported from San Francisco to Frogtown. More money. Then a mill site had to be purchased. More money. Then the mill site must be prepared for setting up the mill and machinery. More money. Next, the mill must be set up. More money. Next, a wood ranche must be bought; you could not run a mill without fuel. More money. Next, a shaft must be opened. More money. Next, a road must be built from the mine to the mill. More money. Next, chemicals must be bought for extracting the silver from the crushed ore. More money. And so it went on.

One after another my friends dropped out of the enterprise, and if they had not dropped out, I believe that every month would have brought forth some new device for tapping their pockets. Every one of them who stuck to the speculation longer than I did, became as financially dry as the middle of the Desert of Sahara.

"I tell you what it is," said one of them; "I have speculated in this silver mine all summer, and now I must wear nankeen pants and gaiter shoes all winter. A sitting of draw poker with one of those Mississippi fellows, who 'does not know anything about the game,' but somehow cleans you out before

you leave the table, is nothing compared to speculating in a silver mine."

I fancy that a great many men could tell a story very much like this. The game was cautiously and carefully played. We were baited with that very gaudy fly which only allowed us to put in a thousand dollars each. We did not see the point at first, but we saw it afterwards.

When a man has invested a small sum of money he is more likely to let the swindler go unprosecuted that if his investment is a large one. Had we invested five, ten, or twenty thousand each in the enterprise, according to our financial condition, we should have devoted time, and trouble, and money to the prosecution of the speculator and his fellow-conspirators; but as our investment was comparatively small, we allowed the matter to drop. And then we were more readily deluded than if a larger sum had been demanded.

Swindling in mining speculations has become an exact science, and to carry on a swindle successfully requires a good knowledge of human nature, and of the expense of lawsuits.

The Revenue silver mine never paid a dollar to anybody, except to the man who sold it. A small quantity of machinery, and a steam engine, of about four dog power, were transported to Frogtown and set up; but they were seized afterwards, and held for a claim of the San Francisco iron merchant.

A shaft was sunk — that is, a hole was dug — about six feet deep, where there was no more prospect of finding silver than in the back yard of a Fourth Ward boarding-house. The deepest and most profitable shaft of the Revenue silver mine was sunk in the pockets of those who bought it.

As for the speculator, I believe he subsequently died in Nevada. As John Phœnix would say, "He was one day addressing a large audience, and when his speech was concluded, he dropped from the end of the wagon where he was standing, and the rope which fastened him to the tree being too short, he fell, and broke his neck." At any rate, I saw his name one day in a paragraph from a territorial newspaper, which read about as follows: —

"John Smith, equine abductor, was treated to a neck-tie sociable yesterday morning at sunrise, under the largest tree that could be found in the vicinity. The boys got up a nice surprise party for him."

The day of mining speculation of this sort has not passed away but the capitalists of New York and other eastern cities have had their eyes opened, and are not so easily taken in as they were of old.

Some of the enterprising speculators have transferred the scene of their operations to Europe, and are making very profitable shafts and tunnels in the money bags of the capitalists of the old world. I know some of them who have gone there with mining claims, which they have represented to be worth millions of dollars, though not really worth ten cents, and they have returned to America with a goodly amount of capital.

I once heard one of these gentlemen tell his experience with a heavy capitalist in London. "The old fellow," said he, "was very cautious. I had a talk with him two or three times, and finally brought him some magnificent specimens. He looked at them very quietly, and then asked, —

"'How much of this stuff is there?'

"'O,' said I, carelessly, "any quantity of it. There are five or six thousand tons of it in sight — right on the surface of the ground. The vein is ten feet wide. We have a claim five hundred yards long, and we think it is at least two thousand feet deep, and the farther down you go, the richer it gets.'

"The old fellow took the specimens once more, and I saw his eyes glisten. I knew then that I had him. The next day I sold him the mine, and got the money. Once I had got it, you bet I took a train for Paris; and I have not been in London since."

VIII.

MINES AND MINING ENTERPRISES OF NORTH AFRICA.

MINING AMONG THE MOORS, BERBERS, AND ARABS—THE FRENCH CONQUEST—GEOLOGICAL SURVEYS—MINERAL WEALTH OF ALGERIA—A WONDERFUL IRON MINE—*MOKTU-EL-HADID*—HOW THE MINE IS WORKED—VISIT TO A MOUNTAIN OF SALT—A REMARKABLE FORMATION—ARTESIAN WELLS IN THE DESERT—SCENE AT THE OPENING OF ONE—EFFECTS ON THE PALM TREE—A PROPOSED INLAND SEA—THE SUEZ CANAL AND ITS HISTORY—HOW IT WAS MADE—ADVANTAGES TO THE WORLD'S COMMERCE.

Northern Africa is a country of great mineral wealth, but it has been only slightly developed. The Moors, Berbers, Arabs, and other inhabitants of that region have never been famous for their mining industry. They have very little knowledge of geology, and understand the working of only a few metals. Most of the gold and silver which they make into filigree and other jewelry comes from Europe; in fact, they have no mines of these metals that are worth mentioning, and when their supply from Europe has been cut off by war or for other reasons, they were obliged to bring it by a long journey from Timbuctoo and other points to the South. The Moors that occupied Spain took back with them, at the time of their expulsion, a knowledge of mining, but they seem to have lost it almost completely in the course of two or three generations.

Among the native people of Northern Africa, the Kabyles, in Algeria, seem to possess more mining knowledge than any other tribe. They have been quite industrious in working the iron mines which abound in their country, and many of their processes display considerable ingenuity. They are excellent workers in iron and steel, and some of their knives, sword-blades, and other tools and weapons, are of a fine quality, and admit of a high polish and finish. Their gun-barrels have long been famous throughout Africa, and the terrible execution

of which they are capable has been practically demonstrated on many battle-fields.

Down to 1830, with the exception of an occasional brief period, no part of Northern Africa had been occupied by any European power. Spain had several times occupied small portions of Morocco and Algeria, and the English and French had shown their force by descents upon the coast, but none of these changes had more than a few years' duration. But in 1830, a new state of affairs began.

France was exasperated by the depredations of Algerine pirates and the perfidy of the Bey of Algiers. She sent an expedition, which landed a few miles from Algiers, and in less than a fortnight the Bey was a prisoner on his way into exile, and his city, with an immense accumulation of treasure, fell into the hands of the invaders.

The French went to Algeria to stay, and they have carried out their intention. They sent their armies to overrun and occupy the country, and for years kept up an energetic warfare, until the Arabs were conquered. There have been occasional insurrections, some of them of considerable magnitude, but all have been unsuccessful, and there is at present no power in Algeria which can drive out the French. They have created harbors, have opened railways, have made hundreds of miles of wagon-roads, have introduced new modes of agriculture, planted forests, and taken many other means necessary to a permanent occupation. The country is progressing rapidly, and at present few of the wealthy and prosperous Arabs would be willing to exchange the new state of affairs for the old. There are many natives who would like to see the French expelled, but they are not among the most influential classes.

One of the first things which attracted the attention of the French, was the question of mining. In the very first year of their occupation, a geological survey of the country was ordered, and a corps of engineers was sent from France for that purpose.

Their report was of the most favorable character. They found copper, lead, silver, zinc, mercury—bath cinnabar, and

sulphide—and in several places they discovered gold, but not in paying quantities. Many concessions for working these mines have been granted; some of them have been profitable, while others have been the reverse, owing chiefly to the lack of means of transportation. The steady increase in the number of railways and wagon-roads is doing much toward the development of these mines, and rendering profitable the working of those which have thus far been managed at a loss.

But the greatest mineral wealth of Algeria is in its iron mines, which abound all along the coast, and so near to it that the matter of transportation is of no great consequence. The ore is of a remarkably good quality, as it contains very little sulphur, arsenic, and phosphorus, which frequently render otherwise valuable material almost worthless. Much of it contains a great deal of manganese, which is very useful in smelting and reducing the metal, and renders it unnecessary to supply that article in making the flux. The ore is so rich that it pays to transport it to England, even though it comes in competition with the iron ores of that country.

The principal use of this Algerian iron is for manufacture into Bessemer steel, and it is said to be vastly superior to all other iron for this purpose. The advance in iron and steel in the past few years has been greatly to the advantage of the iron miners in Algeria, and the most of them are making their fortunes with great rapidity.

One of the richest mines in the country is near Bone, in the Province of Constantine. During a journey through Algeria, I paid a visit to that place, and embraced the opportunity to investigate the iron question.

The mine is nothing more or less than a mountain of iron. It is known in Arabic as *Moktu-el-Hadid*, and was worked very slightly by the Kabyles, previous to the French occupation. The place is nineteen miles from Bone, and a railway connects the mine with the harbor. It is so arranged that the ore, which is piled into the cars at the mine, can be dumped into the holds of the ships in the harbor.

At first glance, you would not suppose this mountain to be of

ny special value. It looks not unlike the famous Iron Mountain of Missouri, but is more irregular, and is not covered in the same way with trees and bushes. But as you examine closer, you see that the mountain is no common affair.

In some places, the mineral crops up above the surface of the ground, and all that is necessary is to blast it away and cart it off. In other places, it appears in veins which are always very thick, and in a slanting position; they rest upon beds of mica-schist, and are covered with a layer of indurated clay, mingled with nodules of iron ore. The ore contains sixty-four per cent. of pure iron; the annual exportation is about half a million tons, and sometimes exceeds that amount. The profit, clear and clean after deducting every thing, is about half a million dollars, or one dollar on each ton of ore taken out. The owners of the mine have a valuable property, and are not inclined to sell it, or to take in partners.

There are other iron mines in Algeria, but none of them are so large or so profitable as the one I have just described. The labor is performed partly by Arab workmen, and partly by Frenchmen. The Arabs are very largely employed, and are quite industrious and reliable. The Kabyles are considered the best and can generally command a trifle more wages than the men of the other tribes for the same work. They come to the cities in search of employment, and after accumulating a certain sum of money, return home contented. Their wants are few, and they live very cheaply.

While I was in Algeria, I made a journey south to the Desert of Sahara. In the desert proper no mines of iron, gold, or silver are to be found, but there are some curious mines of salt, which have been known to the Arabs for thousands of years.

One day the guide called the attention of my companion and myself to a mountain of a peculiar bluish appearance, unlike those that surrounded it. Like all the other mountains in the desert, it had not a particle of vegetation upon it, and we could see no difference between that and the rest, except in its color. I asked what it was.

"It is the famous mountain of salt," said the guide.

This information caused us to look again, and more intently. Herodotus, the Greek historian, who flourished more than two thousand years ago, traveled through this country, and describes five mountains of salt. This which was before us was one of the five.

As we came nearer, we could see that it presented a rough and broken surface, and had evidently been thrown up by some violent convulsion of the earth. That it is the result of an upheaval, is shown by the presence, at the top, of certain layers of sand and marine shells which are found lower down in the plain.

The salt stands in pillars and columns, and in great masses many tons in weight. Salt enough to pickle all the beef in the world could be obtained from this mountain, and then there would be enough left for the preservation of the mutton, pork, and other meats that need the aid of strong brine to keep them properly, and even then there would be a great deal of salt to spare.

During the winter, the rain loosens the blocks and causes crevices to form in the mass of salt rock. The Arabs go there in the spring and break away these blocks by the aid of iron bars; then they knock them to pieces with large hammers, and thus get them into proper shape for transportation. For thousands of years, they have thus been at work on this mountain, taking all they want, but the supply is not by any means exhausted. The quarries are not constantly worked, as the demand for the salt is not very great. The mountain is so far from the coast that it does not pay to carry the salt there, and consequently the demand is purely local.

There is a similar mountain, though much smaller, some distance away to the west. It is more curious in some respects, there being a stream of water which passes it, and has worn a great many pits, caverns, and cavities in the mass of salt. Before reaching the rock, the stream is perfectly fresh, but very soon it becomes impregnated with salt. The stalactites and pillars are very curious in their formation, and when the sun shines upon them they sparkle like great masses

of diamonds. In some places, the crystals of salt jut over the edge of the little stream, and occasionally they fall just a little short of forming an arch.

In the desert proper, the French have done something to advance growth by boring Artesian wells. The great need of the desert is water, and many thousands of square miles of land, on which there is not a blade of grass or plant, might be rendered fertile if any means could be devised to supply them with water. The French have given a great deal of study to this subject, but as none of them are possessed of the power of Moses to bring water from a rock where apparently none existed, they have not yet covered the desert with palm trees and wheat fields.

The palm tree must have water to keep it alive. The Arabs say it lives with its head in the fire and its foot in the water; it seems to be happy with the burning sun of the desert, and not even the hottest rays which the heavens can pour down can disturb it in the least so long as its foot is properly bathed. Take away its supply of water, and it dies in a short time. It must be watered twice a week; there is generally a ditch around the foot of the tree, and this ditch is filled either from a canal or with water carried in buckets or skins. About a barrel full of the liquid is needed for each tree.

It will thus be seen that the limit of a palm oasis in the desert may be sometimes determined by the water supply. I have seen thousands of acres of desert land, possessing no value whatever, which would have been far different had there been a running and reliable stream or spring in their vicinity.

The French determined to improve the supply of water, and in this way increase the value of the country both to themselves and the Arabs. The first attempt was made at the oasis of Tuggurt, in 1856. The apparatus was taken there on camels' backs, with a great deal of trouble, and finally set at work.

After five weeks of labor the drill struck a water course under the gypsum, at a depth of about two hundred feet. An immense spring gushed out with such force that very little

strength was required for removing the tools. It flowed about a thousand gallons a minute, and has been flowing at that rate ever since.

The natives were wild with delight. They danced and sung, and made a great many manifestations of joy, not only on the occasion of opening the well, but for days and weeks afterwards. Ever since then, similar scenes have been enacted in other parts of the desert occupied by the French, whenever a well is opened. The culture of dates has been enormously extended by the planting of new groves wherever the wells are made, and both the natives and their conquerors have found the enterprise of mutual advantage. Sometimes the wells are salt or brackish, but the date palm does not mind any little trifle like that. Whether the water which is supplied to it is fresh or salt, hot or cold, does not seem to make any difference to the tree. It prospers and grows and produces fruit all the same.

A part of the desert is below the level of the Mediterranean, and some of the scientific men and others interested in the development of Algeria, have proposed to dig a canal from the sea, and allow this empty space to be filled. They would thus create an inland lake on which steamers could run, and which could furnish a vast supply of water to groves of palm trees along its shores. But the enterprise is not likely to be undertaken, for a variety of reasons.

In the first place, the cost would be something enormous, and quite out of proportion to the result proposed. The cutting or canal would be more than a hundred miles long, and for quite a distance, forty or fifty feet deep.

The distance which could be flooded is variously estimated from twenty to forty thousand square miles. Of course the land covered by the water would be of no use, and it includes many prosperous oases of date palms, which would have far more water than they need in order to bear fruits. To start with, there would thus be a heavy loss.

The effect upon the climate of Europe of the proposed inland sea has been much discussed. The whole of France owes its

warm, genial climate to the hot winds which blow from Africa across the Mediterranean, and do not lose their scorching temperature till they reach the North Sea and the Baltic. Africa thus becomes a vast furnace to supply Europe with hot air. It is feared by many of the scientific men who have studied the matter, that the inland sea would partially or completely change the climate. The winds would absorb the moisture, and thus form vast rain clouds; instead of conveying warmth and dry air to southern Europe, they would be cool and laden with rain. The grapes would decay upon the vines without ripening; sunny France would be no longer so, and Paris would become as cold as Berlin, and as dreary as London. Doubtless this is an overstatement of the case, but the risk that any of these events might happen outweighs the probable good which the inland sea might accomplish.

Not altogether distinct from mining matters, as it certainly required a vast deal of excavating, is the Suez Canal—a French enterprise of the greatest magnitude. The plan for making a canal between the Mediterranean and Red seas is very old, and has received a great deal of attention from ancient times to the present. One important difference between the canal of to-day and those of the olden time is in its direct course from sea to sea, which makes it altogether a salt-water canal. The old plans were in favor of tapping the Nile and connecting the river with the Red Sea, so that a portion of the route would be a fresh-water one. The size of modern ships rendered it necessary to abandon the Nile scheme altogether, as the shallowness of the river would not permit the passage of the ordinary sea-going vessel, even if we leave unconsidered those vast specimens of the naval architect's skill which are the pride and boast of all maritime nations.

According to Herodotus and other writers, "the first to attempt the construction of the canal to the Red Sea," was Pharaoh Necho II, one of the Egyptian kings, who reigned about six hundred and ten years before Christ. His canal left the Nile at Bubastis, near Zagazig, and followed along a valley leading toward the Red Sea, which then extended much farther

inland than it does at present. Pliny estimates the length of this canal at sixty-two Roman miles, or fifty-seven English ones, and modern measurements show that these figures were very nearly correct. Herodotus estimates the distance from the Red Sea to the mouth of the Nile at one hundred and fourteen miles, and he says that 120,000 men perished while cutting it. This is probably an exaggeration or a slip of the pen, as he doubtless meant to say that that number of men was engaged in the work.

The canal was not finished during the reign of Necho II. The work was continued by his successors, and finally completed, but it was neglected, and the drifting sands soon filled the canal and made it useless. It remained so for centuries, though several attempts were made to clear it out. It is said to have been re-opened about the year 1000 of our era, by one of the Arab sultans, but it was again neglected, with the same result as before.

In modern times, the first to take up the subject and give it careful attention, was the emperor Napoleon, at the time of his conquest of Egypt in 1798. He personally examined the traces of the canal made by Necho and his successors, and ordered one of his engineers to make a careful survey of the route, to ascertain what difference there might be between the levels of the two seas.

This engineer reported a difference of thirty feet, and as this would render it impossible to make a direct canal without locks, a scheme was projected for making use of a portion of the Nile, as in the olden time, and having a system of locks where the salt-water canal joined the river. But the chances of war interfered, as the French were compelled to evacuate Egypt before the plan had been reported.

Nothing more was done until 1846, when a mixed commission was appointed to investigate the matter. They exploded the old error of a difference of level, and showed that the height of the water on each side was so nearly the same as to make no appreciable difference. Further than to establish this fact, the commission did not go, except to draw up some elaborate plans, which never amounted to anything.

In 1855, a project was completed by M. de Lesseps, for a canal without locks, and this is the scheme which has been successfully carried out by the Suez Canal Company. Some of the details were changed, but none of them are of any serious consequence.

It would require too much space to record all the diplomatic and other negotiations that attended the inception of the scheme, and the various means adopted to secure the funds necessary for conducting the work. The financial part of it was quite as difficult as the labor of the engineers, and several times it looked as though the enterprise must be abandoned altogether. The whole capital required by the canal, from commencement to completion, was about seventeen million pounds sterling, or eighty-five millions of dollars!

The work of excavating was begun on the 25th of April, 1859, by a few laborers who dug a small ditch in the presence of M. de Lesseps and four directors of the company, on the spot selected for the Mediterranean mouth of the canal. Immediately after this working, encampments were established all along the line, and the enterprise was earnestly pushed. At first, the work was performed without any machinery. Men and donkeys were the active force, the former armed with shovels, and the latter having a couple of baskets hung across their backs.

A native would fill the baskets with sand and drive the donkey on. They proceeded to where the burden was to be deposited, and when they arrived there, the baskets were emptied, and the donkey was driven back for a fresh load.

But it was found that the removal from agriculture and their other usual employments of the men necessary for digging the canal, was a serious interference with the affairs of the country. Twenty thousand men were required every month, and the drain was found to be so great that, in 1863, the Khedive refused to furnish them.

Matters then came to a stand still, and the company set about replacing manual labor with machinery. Various machines were devised before success was reached, and the magnificent dredges were made, by which the canal was finished.

What was at first thought to be a misfortune proved an advantage, as the dredges were far more economical than manual labor, and enabled the company to finish the work much sooner than would have been possible under the old plan.

The canal was finished in the latter part of 1869, and opened for traffic on the 17th of November of that year. Forty-eight ships went from Port Said to Suez, on that day and the next, carrying guests who had been invited to the ceremonies. All nations of the world may be said to have taken part in the affair, which was on a magnificent scale, and cost many thousands of dollars to the Khedive of Egypt and the canal company. When the ceremonies were over, the canal was formally opened for business, and has been open ever since.

The canal is a hundred miles long from Suez to Port Said. The following figures of its dimensions will be found interesting:

	FEET.
Width at water line, where banks are low, - - -	328
Width at water line, where banks are high, - - -	190
Width at bottom, - - - - - - - - -	72
Depth, - - - - - - - - - - -	26

Slope of bank near water line, one foot in five.

At frequent intervals there are wide spaces where ships may pass, and there are three lakes which were formed by the filling of depressions in the desert. These lakes are pretty sheets of water, and one of them—Lake Timsah—has become a pleasure resort where the people of Cairo go to enjoy salt-water bathing.

The advantages of the canal to the commerce of the world are very great. The old routes have been partially abandoned for the new one, and at present the movement of steamers through the canal averages more than a hundred a month each way, not to speak of sailing ships and smaller craft. The saving of distance by the canal may be shown by the following table.

	Via Cape of Good Hope.	Via Suez Canal.	Distance Saved.
England to Bombay (nautical miles),	10,860	6,020	4,840
New York to Bombay, " "	11,520	7,920	3,600
St. Petersburg to Bombay, " "	11,610	6,770	4,840
Marseilles to Bombay, " "	10,560	4,620	5,940

IX.

ADVENTURES OF DIVERS.

GOING UNDER WATER. — PEARL DIVING. — COSTUME OF THE DIVERS. — HOW THEY DESCEND. — OBTAINING THE PEARL OYSTERS. — DIVING-BELLS. — HOW THEY ARE MADE. — ADVANTAGES AND DISADVANTAGES. — ADVENTURES IN DIVING-BELLS. — SUBMARINE ARMOR. — ITS CONSTRUCTION AND USE. — A DIVER'S ADVENTURE. — A HORRIBLE SIGHT. — THE DIVER'S STORY. — A PEARL DIVER AND A SHARK. — A NARROW ESCAPE. — STRATEGY IN THE WATER. — PEARL-DIVING. — PREPARATORY STEPS TO BE TAKEN. — PREPARING FOR THE SEVERE TASK. — TRAINING THE PAPOOSES IN MEXICO. — OBTAINING THE PEARL OYSTERS. — DIVING-BELLS. — ADVENTURES IN DIVING-BELLS. — SUBMARINE ARMOR. — A HORRIBLE SIGHT. — THE DIVER'S STORY. — A PEARL-DIVER AND A SHARK. — HOW TO AVOID SHARKS AND DOG-FISH. — THE WAYS THAT ARE DARK, AND THE TRICKS THAT ARE VAIN.

To go under the water is pretty nearly as difficult as to go under the earth. Man is not made to live in the water, although he has been known to pass many hours there without touching land. A great many persons seem to have a dread of water in any shape. They rarely bathe, and never drink the liquid when they can obtain anything stronger. It frequently becomes necessary for men to go beneath the surface of the water, exploring the wrecks of ships, and searching for valuable things that are to be found with a varying quantity of fathoms above them. In the East Indies, and in South America, and other parts of the world, the primitive form of diving without any apparatus whatever has been popular for many hundreds of years. The pearl divers of the East are dressed in a costume somewhat resembling that of the famous Greek Slave, minus her fetters. The diver, when preparing to go below, arms himself with a pick, with which to break away the pearl oysters. He is provided with a stone weighing forty or fifty pounds, and attached to a rope several feet in length. Filling his lungs with air, he grasps the rope in his hand, and then jumps from the side of the boat into the water. The weight of the stone carries him down. When he reaches the bottom, he detaches the oysters from the rocks, places them in a bag at his side, and then rises with

his prize to the surface. Ordinarily he does not remain mc than a minute, or a minute and a half, below the surfa though instances have been known of pearl divers who wo remain as long as four or five minutes under the water. course he can only remain as long as the air which has be taken into his lungs will last him, and every one who tries hold his breath knows that this cannot be for a long time.

The diver generally closes his nostrils with a split stick, something of the sort, to prevent the entrance of the wat and he is very careful to keep his mouth tightly shut. Wa and air do not mix well in one's lungs, and no man has e yet invented a system of breathing water instead of air. the depth to which the pearl diver descends, the pressure the water causes a very unpleasant sensation in the ears, a before he has made many subaqueous journeys the drum the ear is generally broken. The breakage of the ear-dr causes no serious injury beyond rendering the person w has undergone it hard of hearing, and instances have be known of divers becoming entirely deaf in consequence of t injury to their ears.

As an improvement upon the primitive form of diving, t Diving-Bell was invented. It is called a bell on account its shape, and not in consequence of any sonorous quality. is constructed in the general shape of a bell, or an invert tumbler; it is lowered, mouth downwards, into the water means of ropes attached to a ship, a boat, or the arm of a d rick projecting over the water. Generally, however, it is down from a ship's side. The earliest diving-bells had arrangement for supplying them with air. After the quant within the bell was exhausted, the diver gave a signal means of a rope, and the bell was drawn to the surface. present the diving-bell has a flexible rubber tube attached it, by which it is constantly supplied with fresh air, so tha diver may remain several hours under water without sufferi for want of a pure atmosphere. The foul air is let out throu a valve in the top of the bell, and is constantly rising in t shape of little bubbles. The pure air is forced down

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case of a pump, which must be kept in steady operation. As long as the pump is at work, and the bubbles are rising from the bell, those above can be assured that everything is satisfactory; but let the bubbles cease to rise, and it is instantly known that something is going wrong.

As the bell descends below the surface, the pressure of the air becomes very great, being equal to the pressure of the water. A dense atmosphere of this sort has many peculiarities. It is easy enough to breathe, but the pressure on the drum of the ear is frequently inconvenient. An ordinary whisper will sound as loud as the customary tone of the voice; and if there are two persons in the bell, and one of them speaks as he would naturally speak in the open air, he will seem to the other to be shouting with the full power of his lungs. A slight blow upon any metallic substance within the bell will sound like a very heavy one, and any noise that would cause no inconvenience in the open air may become absolutely painful in the dense atmosphere in the inside of a diving-bell.

A diving-bell must be made very heavy to carry it downward, and large weights are generally placed around its mouth. A shelf inside serves as a seat for the occupant, and when it is lowered to the bottom, the ground can be leisurely surveyed or examined for whatever object the diver has in view. Sometimes, when two persons descend in a bell, one of them may leave the bell by diving into the water, and then returning, but he cannot go very far. Submarine armor, however, enables him to go quite a distance away from the bell, and return at his leisure. Submarine armor possesses many advantages over the ordinary diving-bell. A man encased in a submarine suit can remain under water for a long time, and move about pretty much as he likes.

Submarine armor consists of a water-proof suit, completely encasing the body of the wearer. It is put on in two sections; the trousers have shoes attached to them, with heavy leaden soles, and at the waist they are firmly fastened to a metallic ring. The upper part of the suit covers the arms, the head,

and the chest, and the lower part of it is fastened to a ring which exactly meets the other. The upper part of the suit is put on, and after it the second, or lower part. The two rings are then fastened together by means of screws, and a thin band of rubber upon them excludes both air and water. The head of the diver is enclosed in a helmet made of brass or other metal, and having a thick plate of glass in front. Air is conveyed inside this helmet by means of a rubber tube, and an air pump must be kept in constant operation, to supply the man in armor with the necessary amount of air. The foul air escapes through a valve in the top, just as it escapes from the top of the diving-bell. A suit of clothing of this sort does not add to the beauty of its wearer; it is very cumbersome, and I greatly doubt if it ever becomes fashionable for an afternoon promenade on Broadway. The helmet might answer very well as a disguise, for the reason that the face of the wearer is almost, and generally quite, invisible.

When a diver is properly encased in his armor, he is swung off from the side of the boat or ship, and sinks into the water. The leaden soles upon his shoes carry him straight down, and serve to keep his feet in the proper place and position. The tube supplies him with air, and he can walk about and use his hands freely. He can handle the pick and shovel, and can enter the cabin of a sunken ship; in fact, he can go in any place where the flexible tube can be made to follow; but all the time he is below, the pump must maintain a steady motion, and the valve in the top of his helmet must work freely. A slight accident may cause his death: should any of the machinery of the pump give way, or some careless person on the ship step upon the tube as it lies along the deck, the diver might lose his life. It sometimes happens that on being drawn to the surface the diver is found dead. Some slight accident has cut off his supply of air, and cutting off the air has deprived him of life.

Sunken ships have been explored by means of this diving armor, and sometimes large amounts of treasure are recovered through its use. In some cases miners have prosecuted their

operations under water by means of this apparatus. A few years since an expedition was fitted out to examine a wreck of a ship which was sunk more than half a century ago on the coast of South America. She was known to have a great deal of treasure on board. Operations had been undertaken frequently by means of common divers and diving-bells to recover the treasure, but none of the enterprises had been rewarded with success. With their submarine armor to aid them, the new explorers were successful, and were handsomely rewarded for their efforts.

Thrilling stories are told by men who have thus gone below the surface of the water. Some time ago a diver was sent down to examine a steamer that had been sunk in about sixty feet of water, and had carried down many of its passengers. The man went down, and made two or three efforts without success to enter the cabin of the vessel. On the fourth visit he accomplished his object, and reached the cabin. Soon he made a signal to be drawn up. When he was on the deck of the ship, and the armor was removed, he fainted. When he recovered, he was asked the cause of his faintness, and replied, —

"It's enough to make any man faint to see what I have seen. I went into the cabin of that ship; it was full of water, of course; but that wasn't all. It was full of the bodies of those passengers that went down when the ship was lost. There was a slight motion of the water, caused by the ground swell: and, as I entered the cabin, the water slowly swayed backward and forward, and swung these bodies with it. At the very door one of them brushed against me, or rather rolled against me, and its dead, glassy eyes stared directly in the face of my helmet, not six inches away. I knew it was dead, but there seemed to be a life-like expression in that cold and stony face. I passed by it, and had gone but a few feet before I encountered another body; and as I looked along the cabin, the vessel, being slightly careened, received a dim light through its windows. Those bodies swinging with the motion of the water seemed more like living than like dead

forms. There was a combination of life and death in their paleness which was absolutely horrible; and not for all the treasure this ship contains will I go down again."

The diver positively refused to repeat his descent, at least in that part of the ship; but others, less sensitive than himself, were found to go down and complete the exploration. None of them, however, appeared anxious to continue on that sort of work, and all were heartily glad when the exploration in the cabin was completed.

The life of a pearl diver is full of adventures. The pearl oyster is found only in warm countries, or, at all events, very rarely in cold countries. The parts of the sea where these oysters are found are generally frequented by sharks. The sharks have a great fondness for divers, but it can be readily understood that the divers do not reciprocate the fondness of this finny tribe. Nothing is more pleasing to the shark — that is to say, an old and well-educated shark — than to make a breakfast off a pearl diver. The diver objects to this little arrangement, and remonstrates with the shark; but the latter doesn't heed his remonstrances, unless they are of the most positive character.

Before going below, the diver generally scans the water very carefully, to see whether any of his man-eating friends are around and ready to welcome him. When he has reached the bottom, finished his labor, filled his bag with oysters, and is ready to ascend, he always takes a good look aloft, to see that no shark is waiting for him. The shark does not pick up the diver at the bottom; he makes no attack as long as the man is beneath him, but watches his chance, and as the man goes upward he makes a sudden dash, and considering the diver a stranger, takes him in. It is not unusual in the pearl diving regions to hear of men who have suddenly disappeared while below; and the inference always is, that these men have been quietly and calmly eaten. A pearl seeker whom I met some years ago while on a sea voyage told me an exciting story of an adventure with a shark in the pearl regions not far from Panama.

"I had in my employ," said he, "about a dozen divers, very active, athletic fellows, who did their duty faithfully, stole all the pearls they could when my back was turned, and sometimes, unless I was very watchful, they reduced my returns very materially. I had a curiosity to learn the peculiarities of pearl diving for myself, and so engaged one of the professional divers to teach me. Well, he taught me.

"My first duty was to strip off all my clothes, swing a bag over my shoulder, take an iron rod about two feet long and sharpened at one end with which to detach the oysters, secure a stone, and after fastening my nose so as not to take in any water that way, I jumped overboard and followed the diver below.

"The water was about thirty feet deep, and the first time I went down I could do nothing but come back again. I didn't bring any oysters that time. The next time I went down, I managed to get half a dozen oysters, and then I came up. Well, after a while I got so that I could get my bag half filled on each descent, and began to think that I was a very fair diver. I did not do much of it, though. Half a dozen times a day were all that I was willing to try. My ears stood it very well the first day, but the second day I went down deeper and staid rather longer than at any previous time, and when I came up my ears were bleeding, and I felt as if there was at least a barrel of water in my head. That was enough for that day; but the next morning I felt all right, and tried it again.

"Always before I went down they cautioned me to look out for sharks. 'Never stir from the bottom,' said one of the men, 'until you have looked up to the top, and find everything is clear above you.' I remembered his advice, and it was well that I did so. About ten days after I had begun to learn the business, I went down as usual, picked up some oysters, put them in my bag, and was starting to go up. I gave my usual look above, and there I saw a big shovel-nosed shark watching me. He was evidently calculating that he had me sure, and considered me as good a breakfast as he wanted. I did not

like his looks, and what to do I did not exactly know. I would have much rather been in the cabin of my schooner than in the stomach of that fellow. My first impulse was to dart up beneath him, and follow the custom of the natives. Generally when one sees a shark, and can't get off in any other way, he rises as rapidly as possible beneath the fish, and sticks the iron rod into his belly. This is a treatment for which the shark is not prepared, and unless he is over-hungry he will generally go away. Sometimes, though, he shows fight; and when it comes to a struggle it is very fierce. The shark is in his natural element, but the man is not in the element to which he is most accustomed, and if the shark is large and persistent he generally wins.

"I did not consider myself up to the emergency of stabbing that fellow with my rod, and thought I would take the chance of going by him. But that was of no use; he would have taken me in as I reached the surface, just as a trout takes in a fly. In an emergency like mine, men think, and they must think very rapidly. I do not believe that I ever thought with more rapidity in all my life. The place where I had been gathering oysters was at the side of a large rock, and I had not left it when I saw the shark. I moved quietly to the other side, thinking to dodge him.

"He saw my movement, and immediately swam over the rock, and placed himself above me. Well, what was to be done next, and what do you suppose I did? You know there is a little fish called the cuttle-fish. It is not much of a fish; it is not handsome; it cannot swim fast, and is not heavy on the fight. When pursued it throws out a sort of inky substance, which blackens the water and makes it sufficiently cloudy to enable the cuttle-fish to escape. It carries this ink in a bag, and keeps it laid up ready for use. Perhaps you might call him a marine editor; that is, the sort of editor that does not fight, but defends himself by slinging ink in the face of his adversaries.

"I was not in a condition to fight, and so I quickly thought I would play cuttle-fish. On one side of the rock the bottom

was a sandy mud, and I immediately conceived the idea of stirring up this mud, thickening the water, and so making a cloud, behind which I could escape. With my pick I stirred the mud, and in less than ten seconds I had the water all around me very thick and cloudy.

"Then I slipped back to the other side of the rock, and went above. I reached the side of the boat with just strength enough to lay hold of it. The men saw that something was wrong, and they instantly seized me, and pulled me on board. They had become alarmed at my long absence, as I was under water nearly twice the time I had been at any previous descent.

"Well, this is not the whole of the story. If I should take off my boot — the right one — you would see some very ugly scars on my foot. That shark watched the water where I was, and just as I reached the surface, and was being pulled into the boat, he discovered me. He darted for me, whirled on his back, — sharks always have to turn on their backs to seize their prey, — and tried to take in my foot.

"The men saw him coming, and they pulled me in about as fast as any man was ever pulled into a boat. That shark did not get me, as, of course, you believe, but he did get hold of the end of my foot. Two toes are gone, and the others are pretty well scarred. If he had made his dive at me one second earlier, I do not believe I should have had any foot on this leg to boast of. Confound these sharks, any how. They do not respect a white man at all, or half as much as they do a brown-skinned native.

"Take a lot of sharks when they are not particularly hungry, and a lot of niggers may swim around them, and they will be as sociable as if they belonged to the same family; but just let them see a white man in the water, and they will take him in as readily as a bull-dog would take in a beefsteak.

"I have been some time telling this story to you, but the whole occurrence did not consume more than two or three minutes."

In Mexico, a peculiar way of pearl-fishing is going on.

Preparatory to entering on pearl-fishing in that country, a contractor must obtain a concession, and take care to be provided with such articles as the Indians most desire—eatables, tools, coarse articles of dress, and toys. The concession is obtained by securing a fifth of the produce of the fishery to the authorities of La Paz, and then, at an expense of five dollars, a right to fish in a certain spot is acquired.

A picturesque scene is presented by the encampment of the Indians with their families, who are mainly supported through the year by the fishery. They impatiently await the coming of their employers, and their approach is the signal for a joyful tumult. All join in the shout of welcome, and many plunge into the sea, to show, by their various performances in the water, their superior fitness for the labors they are anxious to undertake.

Loud cries are heard, of "Engage me, master," "I will make your fortune," "You employed me last year," "I am not only the best of divers, but I am always lucky."

A selection is made, and the contractor takes with him those he deems the ablest hands, pursued by the reproaches and taunts of those who consider they are unfairly neglected. The conditions of the engagement secure the divers' maintenance during the fishery, and a share of the unopened oysters. These requirements granted, shaking hands seals or completes the arrangement.

It is from the 15th of May to the 15th of August that the Mexican fishing is prosecuted. Then it is that calm weather and cloudless sky may be expected, which are indispensable to success. Early in the afternoon a breeze frequently comes from the northeast. Should it rain, the work is partly suspended. The evening is occupied in opening the oysters collected in the early part of the day.

The day after the arrival of the divers, the places most likely to prove favorable are sought by experienced eyes, and a sort of rehearsal is gone through by the Indians. They plunge in to a moderate depth, and remain but a short time under water. Then they prepare themselves for the severer task. Their

ladies, almost amphibious, remain on the bank, and are thus trained to take up the calling of a diver at some future day.

The Indians dive fearlessly, being accustomed to such exercises from their infancy, plunging to a depth of from five to ten fathoms by two cords, a diving-stone and a net, which are connected with the boat, which always accompanies them. The diver, putting the toes of his right foot on the rope of the diving-stone, and his left on the net, seizes the two cords with one hand, and, closing his nostrils with the other, goes to the bottom of the water, where he brings the net around his neck, and collects and puts into it as many shells as he can reach while he remains below, which is generally about two minutes. On emerging from the sea, he discharges water from his mouth and nose, and sometimes blood, which, however, does not deter him from presently resuming his labors. Some men will frequently make fifty trips in one forenoon.

Divers soon find themselves able to remain under water two minutes; some occasionally stay three minutes, but never longer. Young divers at first are curiously affected; blood rushes from the nose, eyes, and ears, when they come up, caused by the compression of the lungs. It is a painful sight, but rest and cold water are the only remedies applied, and, after a short time, the bleeding is not renewed on diving.

The opening of the season is marked by a ceremony, intended to be very solemn. A sorcerer is brought with the divers, to exorcise the sea, and protect them. In the performance of his important duty, this highly-gifted personage addresses awful language to the dog-fish, setting forth his past atrocities and admonishing him to act a better part in future.

A single plunge enables a diver to secure five or six oysters, sometimes seven or eight, but rarely more. The boats which attend them are managed by rowers, or are secured by an anchor, or a stone, fastened to a rope. Some of the divers have a rope around them, attached to the boat. The most prudent course is to be as little encumbered as possible, that they may avoid the sharks and dog-fish. They are, however, generally armed with a short stick, made of hard wood, and

pointed. A lookout or watcher is in each boat, to give a signal to those under water when danger is apparent.

The gangs of younger divers divide into three parties, and rest for longer periods. They go to their labor fasting. When below, they of course snatch the oysters up as quickly as possible, using the short stick they carry, when necessary to separate them from any other substance. Finding an oyster likely to contain a pearl, the stick is sometimes used to open it, and the diver will reappear with a shell or two, and tell that during three minutes immersion he could discover nothing but shells. The fraud is often discovered, and the stick freely used on the head or back of the cheat.

Jules Verne, in his *Twenty Thousand Leagues Under the Sea*, gives the account of an adventure of a pearl-diver, which is of the most thrilling nature; Prof. Aronnax has gone down to the bottom of the sea, in a peculiar diving apparel, which allowed him to remain under water for a considerable time, with Captain Nemo of the Nautilus, and two or three other men. The professor tells his story thus:

"About five yards from me a shadow appeared, and sank to the ground. The disquieting idea of sharks shot through my mind, but I was mistaken; and once again it was not a monster of the ocean that we had anything to do with.

"It was a man, a living man, an Indian, a fisherman, a poor devil, who, I suppose, had come to glean before the harvest. I could see the bottom of his canoe anchored some feet above his head. He dived and went up successively. A stone held between his feet, cut in the shape of a sugar-loaf, whilst a rope fastened him to his boat, helped him to descend more rapidly. This was all his apparatus. Reaching the bottom, about five yards deep, he went on his knees and filled his bag with oysters picked up at random. Then he went up, emptied it, pulled up his stone, and began the operation once more, which lasted thirty seconds.

"The diver did not see us. The shadow of the rock hid us from sight. And how should this poor Indian ever dream that men, beings like himself, should be there under the water

watching his movements, and losing no detail of the fishing. Several times he went up in this way, and dived again. He did not carry away more than ten at each plunge, for he was obliged to pull them from the bank to which they adhered by means of their strong byssus. And how many of those oysters for which he risked his life had no pearl in them! I watched him closely; his manœuvres were regular, and, for the space of half an hour, no danger appeared to threaten him.

"I was beginning to accustom myself to the sight of this interesting fishing, when suddenly, as the Indian was on the ground, I saw him make a gesture of terror, rise, and make a spring to return to the surface of the sea.

"I understood his dread. A gigantic shadow appeared just above the unfortunate diver. It was a shark of enormous size, advancing diagonally, his eyes on fire, and his jaws open. I was mute with horror, and unable to move.

"The voracious creature shot towards the Indian, who threw himself on one side in order to avoid the shark's fins: but not its tail, for it struck his chest, and stretched him on the ground.

"This scene lasted but a few seconds; the shark returned, and, turning on his back, prepared himself for cutting the Indian in two, when I saw Captain Nemo rise suddenly, and then, dagger in hand, walk straight to the monster, ready to fight face to face with him. The very moment the shark was going to snap the unhappy fisherman in two, he perceived his new adversary, and, turning over, made straight towards him.

"I can still see Captain Nemo's position. Holding himself well together, he waited for the shark with admirable coolness; and, when it rushed at him, threw himself on one side with wonderful quickness, avoiding the shock, and burying his dagger deep into its side. But it was not all over. A terrible combat ensued.

"The shark had seemed to roar, if I might say so. The blood rushed in torrents from its wound. The sea was dyed red, and through the opaque liquid I could distinguish nothing more. Nothing more, until the moment when, like lightning,

I saw the undaunted captain hanging on to one of the creature's fins, struggling, as it were, hand to hand with the monster, and dealing successive blows at his enemy, yet still unable to give a decisive one.

"The shark's struggles agitated the water with such fury that the rocking threatened to upset me.

"I wanted to go to the captain's assistance, but, nailed to the spot with horror, I could not stir.

"I saw the haggard eye; I saw the different phases of the fight. The captain fell to the earth, upset by the enormous mass which leant upon him. The shark's jaws opened wide, like a pair of factory shears, and it would have been all over with the captain; but, quick as thought, harpoon in hand, Ned Land rushed towards the shark and struck it with its sharp point.

"The waves were impregnated with a mass of blood. They rocked under the shark's movements, which beat them with indescribable fury. Ned Land had not missed his aim. It was the monster's death-rattle. Struck to the heart, it struggled in dreadful convulsions, the shock of which overthrew Conseil.

"But Ned Land had disentangled the captain, who, getting up without any wound, went straight to the Indian, quickly cut the cord which held him to his stone, took him in his arms, and, with a sharp blow of his heel, mounted to the surface."

X.

RUSSIAN [illegible] AND MINING.

EXTENT OF THE EMPIRE—ITS [illegible] AL[illegible] —PETER THE GREAT, AND WHAT HE DID—NIKITA DEMI[illegible] TY ESTATES—IRON MINES AND A VISIT TO THEM—WH[illegible] IRON IS MADE—COPPER AND MALACHITE—A WONDERF[illegible]E STORY OF AN EMERALD NECKLACE—GOLD MINING IN [illegible]A—HARD [illegible]S OF THE MINERS—HOW THEY ARE TREATED—MODE O[illegible]

The empire of Russia covers nearly an eighth of the land surface of the globe. Her northern limit is the Arctic Ocean, and the regions of eternal ice and snow; on the south, she rests upon the Black Sea, in a region of almost tropical warmth. Tropical fruits grow in her Crimean possessions, while polar bears and reindeer wander over the frozen and barren lands of her extreme north. She has every variety of climate, and every variety of soil. Here are long ranges of lofty mountains enclosing countless treasures of wealth in their rocky bosoms; beyond them you find wide stretches of treeless steppes, fertile as our western prairies, and boundless, apparently, as the sea. Wide and deep rivers wind through her territory, and facilitate the communications which commerce demands; broad lakes spread their shiny surfaces at frequent intervals, and reflect the primeval forests that line their shores. In a word, Russia is a little world in herself. The races of men included in her inhabitants are as varied as her climate; it is said that more than a hundred distinct and different languages are spoken by the subjects of His Imperial Majesty, the Autocrat of all the Russians.

With such a vast territory, and such a variety of mountain and plain, hill and valley, within her borders, Russia may be expected to hold a prominent place as a land of mines.

Such an expectation would be well founded, as the land of the Czar is in the very front rank of mining countries. The intelligence and enterprise of Peter the Great led to the development of her mining interests, and the work thus begun has been steadily followed to the present day.

Probably the best mining school in the world is at St. Petersburg. It has constantly nearly three hundred pupils, all supported at the expense of the government. The establishment is the geological mirror of the entire empire. The mountains of Lapland and the Caucasus, Finland and the Valdai, the vast Ourals, the Altai range and the peaks of Nerchinsk and the Baikal, Siberia and Kamtchatka, in fact every part of Russia, have been drawn upon to fill its museum. Not only have they contributed, but they steadily continue to do so, year after year, as fast as new discoveries are made; and the government spares no pains or expense to make the collection the most perfect in the world.

Gold, silver, lead, iron, tin, copper, and other metallic ores are there in abundance, and afford the student the most ample opportunity for study. In the collection of semi-precious or valuable stones there is a bewildering array. We find the topaz of all shades; we find rubies, emeralds, beryls, amethysts, agates, turquoise, onyx, garnets, aqua-marines, malachites, marbles, lapislazuli, porphyries, and other stones in endless variety. As an illustration of the great variety of the mineral products of Russia, let me mention a little circumstance. On my desk, and lying before me as I write, is a paper weight I brought home from Siberia. It is a small mosaic, perhaps three inches by five, and contains no less than twenty-one kinds of variegated marbles from the Altai mountains. One piece is white, and another is nearly black, and there is great variety between the two extremes.

Almost the only mineral products not known to exist in Russia is diamonds. They have been found in a few instances, but in very small numbers, and under circumstances that led to a strong suspicion that the places of discovery had been "salted."

In order to facilitate the study of the pupils in this school of mines, and make it as practical as possible, all the machinery and apparatus used in a mine has been arranged in an immense museum—some in the form of models, and others of their full size. Great mechanical skill has been displayed in the preparation of this machinery; whether in the shape of models or of full size, the working is perfect, and a student can easily understand from them the labor of the miner, and its result.

Underneath the immense building there is a reproduction of one of the mines at Perm, one of the cities of the Ural mountains. The utmost care has been taken to make the reproduction perfect. You visit the place exactly as you would visit a real mine, and you are shown through it by the light of torches. You have the same temperature that you would have in the mine of which this is a copy, and the same kind of atmosphere.

The character of the earth, the changes of color, the succession of layers of earth, rock, and ore, the machinery, the tools of the workmen, all lead a visitor to suppose he is really in a mine, and that the actual work has only been suspended a few hours while the laborers have been allowed a half holiday.

The great mining centers of Russia are in the Ural and Altai mountains, especially the former. The wealth of the Urals in minerals was almost unknown until the time of Peter the Great, when he sent some engineers to make an examination. Previous to that time some gold had been found, and brought to Moscow; and it was known that the former rulers of the kingdom of Kazan derived much of their wealth from the gold mines.

But hardly anything was known of the other mineral riches of the mountain range. It did not take a long time for sharp-eyed engineers to discover the existence of iron and copper, and further research showed that they were to be found in large quantities. As soon as the facts were known, the government determined to work the mines on its own responsibility, until their riches could be demonstrated, and

private parties induced to operate on their own account and risk.

The first mineral exploration of this region was made by Nikite Demidoff, in 1701 or 1702. Peter the Great sent him there from Tula, a place which has since become of considerable importance as a manufacturing center. He had a very clear head for his business, and went at it in earnest, and the result is seen to-day in the immense prosperity of the mines. As a reward for his industry, the emperor gave him a grant of territory amounting to nearly five thousand square miles, with whatever mineral or other wealth might be found there.

This princely estate has remained ever since in the possession of the Demidoff family, and has made it the richest family of all Russia, with the exception of the Romanoffs (the Imperial House). It has been admirably controlled, and the owners have spared no pains or expense to secure the most intelligent direction and management. They have conducted everything on a liberal scale; the towns and villages which they have built up are among the prettiest, neatest, and most comfortable in all Russia.

In this last particular they are worthy of imitation everywhere, and many great establishments in Europe and America would be, to-day, more prosperous if they followed the example of the Demidoffs. There are some prominent instances of manufacturing or mining prosperity growing in part from an attention to the wants of the workman, the education of his children, and a general regard for his welfare. The most notable one now occurring to me is that of the Fairbanks Scale Works in Vermont, whose products have obtained a world-wide fame. They have built up upon what was the wilderness, a prosperous town, with schools, libraries, lecture and reading rooms, and they have given inducements for their workmen to be industrious and economical, and become house-owners in their own right. The Fairbanks Brothers never heard, perhaps, of the Demidoffs, but they have followed almost the same course, and with the same result.

Every year the Demidoffs select several of the brightest

paths in each village, and send them to the mining schools of St. Petersburg, and also to France, England, and other countries. These spend several years away from the Urals, and when they return they bring a stock of very valuable knowledge which is of great practical use.

In my journey through Russia, I visited the mining regions of the Ural, and also of the Altai Mountains, and was greatly interested in what I saw.

The castle of the Demidoffs, as it is called, stands on the bank of a small river in the Urals, at the town of Neviansk. Part of it was built by the elder Demidoff; it has since been enlarged, so that it is now a goodly sized palace. In it is a large saloon with fresco paintings by an Italian artist who was specially engaged for the work, and it has several rooms which would make large halls anywhere else. The furniture was made expressly for the house, and is renewed from time to time, whenever it becomes antiquated or faded. Several rooms are kept for the use of travelers, and everything, including the table, is furnished free of charge.

You may arrive there at any hour of the day or night, and find a warm welcome, and a room ready for you. You are fed with a most liberal hand, and may have the best wines known to the European market—champagne, port, sherry, anything and everything you choose. Stay as long as you please, go where you wish to, and you have no bill to pay. Let us hope for a speedy adoption of this Demidoff custom everywhere, with the assurance that it will be highly popular with the majority of visitors, and tend to a large increase in their number.

The principal mining town of the Demidoffs is on the river Tagil, and is known as Nijne Tagilsk. It has a population of about twenty-five thousand, and contains many fine buildings, including churches, hospitals for the workmen, schools, academies, dwellings for the directors and sub-directors, and an immense pile in which are the offices of the administration.

The smelting furnaces, forges, rolling mills, machine shops, and the like, are on an enormous scale, and are surpassed by

very few establishments anywhere in the world. Much of the machinery is made on the spot, and the facilities are such as to astonish any visitor, even when he knows beforehand that he will see something colossal.

All the smelting is done with charcoal, and consequently the charcoal burners are an important element of the population. The forests of the estate cover many hundreds of square miles, and are managed with great care. Not a tree is cut without the order of an officer, and the work is so arranged that the young trees are protected until they are of suitable size. When a piece of ground has been cleared, it is replanted, and in eighty years it can be cleared again.

The iron ore is about a mile from the town, and near the top of a hill, so that it can be rolled directly into the works with very little labor. It is of the kind known as magnetic ore, and the supply is simply inexhaustible. It is worked in an open quarry, no tunneling or shafting being needed, and as the vein is four hundred feet wide, eighty feet thick, and a mile or more in length, there is no danger that the supply will be exhausted for some thousands of years. And if it should be, there are other and larger deposits not far away.

Copper is also found in this vicinity, and not more than two miles from the iron mine. It was first discovered about the beginning of the present century, and has since been worked to great advantage.

The most remarkable product of copper is the substance known as malachite. It is found in various parts of the world wherever there are mines of copper, but nowhere else in such quantities as in the Oural mountains. Malachite is nothing more nor less than an oxide of copper. The chemists know exactly how it is formed, but they cannot make it any more than they can make the diamond, though they understand perfectly well the composition of that highly-prized stone. Certain salts in the earth mingle with the copper ore and the water that finds its way through the earth, and these ingredients, soaking slowly downward into crevices and hollows in the rock, form the substance of which the Russians make so much use.

In 1835 the largest mass of malachite ever known was found on the Demidoff estate. The miners, who were working a vein of copper, found some shreds or strips of copper extending downward, and the superintendent of the mine ordered them to follow these shreds, in hopes of striking another vein. The work was pushed forward, or rather downward, and the stray threads of ore were traced in all their windings. Two hundred and eighty feet below the mine, the threads disappeared, and the superintendent was about to give up the enterprise in disgust and despair, when the men suddenly came upon a huge mass of malachite. It was broken up and taken to the surface, and the aggregate weight of the mass was estimated at seventy tons! It was this lot that supplied the most of the malachite in the Church of St. Isaac, and from it, also, was made the enormous vase which the Emperor of Russia sent to His Holiness the Pope.

We use malachite for jewelry, and think it very good; those of us who have been in St. Petersburg will recall the Church of St Isaac, where there are whole columns apparently of solid malachite. I say apparently, for those columns are of granite, with a malachite veneering an inch or two in thickness, for the reason that the material does not come in sufficiently solid shape to be used for making columns. It is a good deal honey-combed, and there are numerous vacant places in a large block of it. There was a block of malachite in the Paris Exposition which measured something like seven feet in length by four in width, and there was a nicely-polished spot on one side, a couple of feet in length, and a foot and a half in width. This was said to be one of the largest solid blocks of the material in Russia, and it was regarded as a great curiosity by many thousands of visitors. At the Philadelphia Exhibition in 1876, there was much interest manifested in the Russian department, in consequence of the fine display of this article. There was a fireplace whose mantel and side-pieces were solid slabs of malachite. Then there were two or three large vases and other ornamental pieces, all of the same material; and very rich they were. People were never weary of gazing upon these things and commenting on their beauty.

There are several other mining estates besides this in the Oural mountains, and some of them are nearly as extensive. There the government has establishments of its own, where it makes its machinery for ships of war and other purposes, and manufactures cannon and cannon shot, and many other things which are constructed of iron. or steel. One of the private works which I visited was that of Issetskoi, where they make iron of peculiar toughness and polish. Nearly all the "Russia sheet-iron" which is so popular in America, for the manufacture of stove pipes and parlor stoves, comes from this establishment. It is capable of being rolled to the thinness of letter-paper, and will stand a vast amount of bending before it breaks.

At one of the mining and manufacturing works in this region, there is an establishment for the production of cutlery, and a vast amount is annually turned out. Its sword-blades, knives, and other things are of great fineness, but generally they are not as nicely finished as the products of Birmingham and Sheffield. About 1848, a process of making Damascus steel was invented by General Anossoff, who was then in charge of the works, and since then, blades that could be bent double, without danger of breaking, have been turned out in great numbers. Some of these have found their way abroad, but the government does not facilitate their sale outside the country.

In the Oural mountains, on the great road from Russia to Siberia, is the town or city of Ekaterinenberg, which was founded by the Empress Catherine II, the imperial lady who became famous, among other things, for her peculiar and rather summary ways of making love. Catherine was stately and not ill-looking; the town which perpetuates her name, perpetuates also her characteristics. I drove into it one Christmas morning, after a long ride over the dreary steppes of Siberia, and as I first looked upon its broad streets and the lake around which its principal edifices are built, I thought I had not seen anything lovelier in the line of Russian towns.

It has a population exceeding twenty thousand. Five-sixths

of the inhabitants are connected in some way with the mining interests of the surrounding region, and possibly the occupations of the remaining sixth are not far removed from them. All the copper money circulated in Russia is coined here, and the place does a large business in lapidary work. Amethysts, beryls, rubies, emeralds, and other gems are cut here, and so extensive is the business that the servants at the hotels, and itinerant merchants on the street pester you to purchase these stones, and dozens of others. Seals in countless variety can be had here, and wonderfully cheap when compared with the prices of the same articles in Moscow or St. Petersburg. The government has here a large lapidary establishment, and all its products go, or are supposed to go, to the Imperial palace at St Petersburg. From this place come the great majority of the semi-precious stones which are given away by the emperor. And hereby hangs a tale.

During the reign of the Emperor Nicholas, some children who were playing in the dry bed of a brook several miles from Ekaterinenberg, found some curious stones which they carried home. These lay around the cottage for some time, and were not thought to be of any value, but one day an officer happened to see them and recognized their character. They were sent to the government establishment, and there disappeared.

They were emerald crystals of unusually fine character, and by law and custom were the property of the emperor. Instead of going to St. Petersburg, they were sent to Germany, and sold, and in course of time were bought by one of the princes of the reigning family, as a present for his wife.

Some years later, she was at St. Petersburg, on some grand occasion, and wore these emeralds. The empress admired them, and asked where they came from.

"They are from Siberia," was the reply.

The empress was astonished, and communicated the fact to the emperor.

There was a great row at once. An officer was sent to Ekaterinenberg to search the house of the director, and all other persons connected with the imperial factory. He found

several stones of great value in the house of the director, and as the latter could not explain, he was arrested and sent to prison, where he died a few years later. Many people believed, and still believe, that he was innocent, and that the theft was committed at St. Petersburg, by some member of the imperial family.

Strange to say, very few emeralds have ever been discovered in that region, and none since that time of equal value with those that had such a curious history.

The principal gold mining of Russia is carried on in the Asiatic portion of the empire. Some deposits have been found of enormous richness, and many fortunes have been made by mining for this precious ore. Formerly, the business was entirely in the hands of the government, but in the last twenty years it has been given up to private enterprise, the government exacting a tax of fifteen per cent. on all gold taken out. In some districts the government continues to manage the business, but it only does this where it cannot let it out to advantage.

The processes employed are various. In some of the mines the earth is washed by means of machinery, much like that used in California, but with a greater expenditure of labor in proportion to the amount handled. In the valleys of the streams which flow into the Yenesei and other rivers, there are many mining establishments; there are others near Lake Baikal, and others again on some of the rivers flowing into the Amoor.

The government mines are worked by convicts, who receive no pay. Only their board, clothes, and lodging are supplied to them, and these are not always of the best quality. The private miners employ their workmen in the villages and towns; they begin operations as early as possible in the spring, and close in the latter part of September. To obtain a concession for working a mine, the applicant must either be a hereditary nobleman, or a merchant of the second guild or class. He obtains a concession five miles long, and about six hundred feet wide, on the borders of and including a stream, so as to give him as much water privilege as possible.

When a claimant has an allotment, he must work it at least one year out of every three, under pain of forfeiture, and there are other requirements with which he must comply.

There is generally a heavy outlay for buildings and machinery before the mining begins. To get at the pay-dirt, as it is called in California, the surface earth must be stripped off, and sometimes this stripping is twenty or thirty feet deep. Holes or shafts are sunk to ascertain the depth of the stripping and pay-earth, and from the amount of gold in the latter it is very easy to form an estimate of the probabilities of profit.

Some of the concerns employ two or three thousand workmen, and half as many horses. The cost of horses is the heaviest item of expense, as the loss is very great, and to this must be added the cost of keeping the animals. It often happens that the hay, provisions, and everything else must be carried two or three hundred miles, and consequently the capitalist who goes into the mining business in Siberia, must have a long and deep and well-filled purse to start with.

In these mining establishments, the work is very severe. The bell is rung at half past two in the morning, and a man must be at his post by three. He gets half an hour each for breakfast and tea, and an hour for dinner; he works until nine o'clock at night, and takes his supper when he gets through. If he is in debt to his employer, and the latter generally manages to have him so, he works every day—Sundays, Saints' days, and all—through the season.

The task set is for five men and two horses to break up and cart away two cubic fathoms of earth per day, and they may quit work whenever they have done it. Or they may work "extra," and get pretty high wages for it, and altogether a man can earn not far from thirty dollars a month by making long and late hours.

It is absolutely necessary, for the interest of the employer, that he should give his men good and abundant food, provide them with comfortable lodgings, and have a hospital for those who become ill. Sometimes two or more establishments unite to hire a surgeon, and in this case he makes a daily round to

see if any one needs his services. The proprietors also maintain stores where they supply their workmen, and it is not considered respectable to charge any profit on the goods beyond enough to pay the cost of transportation and handling.

The workmen are a thriftless lot, generally, and rarely save anything. When their season is over, they proceed to the large towns, and there waste their substance in riotous living. The spring comes and finds them without a copeck, and possibly in debt, from which their only exit is by hiring out to a gold miner, and getting the advance of a month's pay which custom has established.

XI.

A DAY IN POMPEII.

A VISIT TO POMPEII. — NEAPOLITAN HACKMEN. — AN INTERESTING ADVENTURE. — HOW TO AVOID A QUARREL. — BEGGARS. — BEGGARY AS A FINE ART. — A PICTURESQUE SCENE. — MAKING MACARONI. — TRICKS OF AN OLD ROOSTER. — POMPEII. — ITS HISTORY. — DISCOVERY OF THE BURIED CITY. — A SCENE IN THE STREETS. — AN ANCIENT BAKERY. — HOW THE MILLS WERE TURNED. — INVESTIGATING AN OVEN. — A WONDERFUL DISCOVERY. — PRIVATE CONDITION OF THE HOUSES. — ADVERTISING IN OLD TIMES. — POMPEIIAN PERSONALS. — A PICTURE OF THE DESTRUCTION. — OBSCENE OBJECTS IN THE CITY.

On a pleasant spring morning several years ago, I started from Naples to pay a visit to the ruins of Pompeii. Our party consisted of four persons; and our first work was to engage a carriage, as we thought the carriage road would be preferable to the railway. Engaging a carriage in Naples is a tax upon the patience equal to some of the trials which were visited upon Job. I am not quite certain that Job would have remained patient after a contest with Neapolitan hackmen. Boils would be nothing compared to it.

One of the school-books that I studied in my younger days made the assertion, "A horse is a noble animal." I do not question the nobility of the horse, and his possession of blue blood; but of one thing I am certain, and that is, a great majority of those who associate with him are the reverse of noble. Hackmen, all the world over, are proverbial for dishonesty. Horse-jockeys are never mentioned as types of human perfection; and the history of the race-track is the history of a great deal of fraud. If the horse is a noble beast, it must be that his nobility and excellence of character develop the opposite qualities among his human intimates.

Hackmen are bad enough everywhere; but I think the per-

tection of badness is to be found among the hackmen of Naples. They will lie with the most unblushing impudence; and if they receive any future punishment for telling untruths, their roasting will be perpetual. The day before our journey to Pompeii, we had chartered a carriage to take us to the Sibyl's Cave, and the other curiosities in the neighborhood of Pozzuoli. We made a positive bargain with the driver, including the amount which he was to receive as drink money. I believe we were to pay twenty francs for the carriage, and two francs for drink money. When we returned and were settling the bill, he swore by all the saints in the calendar, — and he named every one of them, — that we agreed to pay thirty francs for the carriage, and ten francs for drink money. He took his hat from his head in his rage, and threw it upon the ground, pulled his hair, and made things in general very unpleasant. He called several unwashed Neapolitans to witness that no carriage was ever hired at a lower rate than the one which he insisted was our contract price.

We found that we could not reason with him; and so we lighted our cigars, and waited for his paroxysm of rage to come to an end. We finally compromised the matter by paying twenty-five francs for the whole business; that is, we compromised by handing him the money, and walking away. He followed us two or three blocks; in fact, he stuck to us until we entered our hotel, and there we lost sight of him.

The hackman who was to take us to the buried city might have been useful, but certainly he was not ornamental. He was covered with dust, so that he resembled a walking ash-heap; and as for washing, I do not think he had ever experienced its terrors. Judging by the odor which arose from his skin, he had been put through some embalming process, in which garlic was the preservative substance. He resembled a sponge which has been dipped in garlic water, and kept without squeezing. His clothing was of all sizes except his own. His trousers were made for a man twice as large as he; and his coat for one of about half his dimensions. His face was as prepossessing as a basket of old bottles; and as for his manners, he did not appear to have any to boast of.

I spoke to him in French, which he pretended to understand, but could not comprehend. He answered in a mongled [illegible] of French and Italian, in which there was no French to speak of, and very little Italian. I forgot the exact sum he agreed to pay, but think it was altogether about twenty [illegible] francs.

I may as well explain here, that on our way back we invented a new plan for paying him, and at the same time saving trouble. When we neared the hotel on our return, I counted out the money in francs and half francs, and threw in a few copper coins by way of adding to the confusion. With the proper amount in my hand, I stepped from the carriage, and waited until my three companions were a dozen yards away; then I dropped the money into the hands of the driver, and started at a rapid walk to overtake my friends. Before he had finished counting the money we were inside the hotel. As we walked up stairs, I heard a volley of Neapolitan and French oaths following us into the building, and rolling through the hall like a small cloud of smoke.

We started from Naples in the direction of Vesuvius, passing through several villages on our road to Pompeii. The road was excellent, being paved or macadamized the entire distance, and ornamented with houses and beggars in about equal proportions.

The beggars deserve great credit for the study they have devoted to the perfection of their art. Sores are cultivated as a handsome man would cultivate his mustache; and as for a withered leg, it is worth a fortune to its possessor. Every time our carriage halted, the beggars surrounded it, as flies in July surround a lump of sugar, and pretty nearly for the same reason, as they wanted something on which to exist. They accosted us in two or three languages, Italian of course predominating. We told them, in French, in English, and in German, to go away, and that we would give them nothing, but they stuck to us with the most unruffled pertinacity. They had heard all that before, and knew that if they were adhesive, they had a good prospect of extracting something. I tried a new plan on them, and found that it worked well.

Assuming an air of great indignation, and with as muc severity in my face as I could command, I addressed thei very loudly, with my hands extended, in Russian and Chines Those languages were new to them, and fearing that it wa some horrid imprecation, several of them dropped away. afterwards found the plan quite successful, not only wit Italian beggars, but with beggars of every nation. Tell thei in any language to which they are accustomed, that you wi give them nothing, and, if you are so minded, consign thei to the infernal regions, and they do not mind it; but if yo assume a priestly attitude, and utter something very solemn in a language they do not understand, you have a fair pro pect of getting rid of them.

At one place, on the road to Pompeii, there is a small hil From the foot to the summit the distance is not more tha one to two hundred feet; but the slope is so steep, that horse in ascending it, do not travel faster than a walk. At the foo of this hill, four beggars — middle-aged women — wer located; and they evidently had purchased a monopoly, o possibly a grant from government for the possession of th spot. In front of a small wine shop they had erected pavilion, and each of them had a comfortable chair. The watched the place, and attended closely to business durin the entire day. When they saw a carriage approaching, the left their chairs, and proceeded to the road, adhering closel to the vehicle until it reached the top of the hill. They begge persistently until they received what they demanded, or th top of the hill was reached. Then they returned leisurely t their chairs, and waited for the next customer.

If there was but a single carriage at a time, all of thei worked it. If there were two carriages, the beggars divide into couples; and if by any chance there were four carriage together, the professionals scattered, and each of them took vehicle. I drove out on this road several times, and alway found it begged by the same persons. I proposed one day t my friends to engage five carriages, and drive them out thei together. I thought that we might kill the beggars by cau

ing them to die of grief and rage at seeing a carriage pass with at being able to annoy its occupants.

Another object of interest along the road, and closely associated with the beggars, is the manufacture of macaroni. I did not enter the houses to see how the stuff was made, but I saw great quantities of it drying on frames in front of the houses of its manufacture. One of my companions, who had witnessed the process, said they made macaroni by putting some dough around a long hole, and letting it dry.

He said the holes did not cost anything, and the dough was very expensive. "And that is the reason," said he, "why the unfounded stuff is so cheap."

I was rather fond of macaroni as an article of diet; and so my friend advised me, if I wished to continue so, to remain in blissful ignorance of the manner of its preparation, and not to ask any questions.

I took his advice, and to this day do not know much about the process.

One thing in connection with macaroni, which amused me much, was the dexterity of the chickens in eating it.

A string of macaroni in its soft state, four or five feet long, is hung across a horizontal bar in such a way that the ends are a foot or so from the ground. The frames look like candle-moulds, with freshly moulded candles hanging from them. The macaroni, as it hangs, is pretty thick, there being just space enough between the sticks to allow them to dry. When the stuff is soft, chickens can easily eat it. As it hangs from the frames, these birds would get beneath them, and bite off the ends of the perpendicular sticks.

The young chickens were rather awkward; but the old hens and roosters were very successful. I watched one venerable old cock under a frame, and studied his performance. He elevated his head as if he were peering through a gun barrel up to the sky. He took careful aim, and then jumped upwards, with his mouth open. The soft macaroni went down his throat a couple of inches or so, as a sausage might go down the throat of a terrier; and at the exact

instant when his head was highest, he closed his bill, and nipped off the morsel. I saw him take half a dozen bites in that way, and he did not miss his mark a single time in the whole performance.

We had pleasant glimpses of the Bay of Naples, though not as many as we could have wished on account of the height of the fences. After a drive of something more than an hour, we reached the gate of Pompeii. Dismounting from our carriage, and paying two francs to the custodian, we entered the ancient city.

Pompeii was violently shaken by an earthquake in the year 63. Several temples tumbled down along with the colonnade of the Forum. The theatres and many tombs and houses were also overthrown. Nearly every family went from the place; and it was some time before they returned. The senate hesitated for some time whether to rebuild the city or not, and finally decided to do so. The work of rebuilding was going on quite vigorously, when all at once came the terrible eruption of 79. It buried Pompeii under a deluge of stones and ashes, and buried Herculaneum under lava and liquid mud.

These cities and many villages were wiped out in a single day, and a large region of country was depopulated. After the catastrophe, some of the inhabitants returned, and made excavations for recovering their valuables. Some robbers also crept into the city. The Emperor Titus entertained the idea of cleaning and restoring the city, and sent two senators to examine the ground; but the magnitude of the work frightened the government, and the restoration was never undertaken. In time Pompeii became almost forgotten, and its site was lost. For more than a dozen centuries the locality where Pompeii had stood was unknown.

In 1748, under the reign of Charles III., when the discovery of Herculaneum had attracted the attention of the world to that locality, some vine-dressers struck upon some old walls, and unearthed a few statues. The king ordered some excavations to be made in the vicinity; but it was not until eight

year later that any one supposed that they were exhuming Pompeii. Since that time the work of excavation has gone on with a great many intervals of inactivity. Whenever the government makes an appropriation, or some crowned head or other wealthy personage makes an addition to the Pompeii fund, the work is prosecuted; but as soon as the money is expended the work stops.

It is now more than a hundred years since the excavation began, and the third part of the city is not yet uncovered.

Since 1860, the whole system of work and management has been reformed, and moralized, as it were. All the guides and gatekeepers are under the control of the government.

The visitor pays two francs at the gate, and is guided about the city by a man clad in uniform. Notices are posted in all the modern languages, telling visitors not to give money to the guides under any pretence whatever, and forbidding the guides to receive the money. This is all very well as far as it goes; but human ingenuity is able to get around the rule.

We had a guide who spoke French fluently, and was a very polite and agreeable fellow. He took pains to call our attention to one of the signs, and assured us that he could not receive a penny under any circumstances. But at almost every step he had photographs to sell. Whenever we found anything particularly interesting, out from his pocket came a package of photographs, and of course we purchased. By the time we had finished our journey, we had bought photographs enough to stock a small store; and the profit on the transaction was probably six times as much as the guide would have wrung from us had the old system been in vogue. It is very evident that the government winks at this transaction: otherwise the guides would not be allowed to sell photographs or anything else.

We walked through streets silent and deserted, except by groups of visitors like ourselves, and the occasional patrolmen or guides. We walked on the pavement where, two thousand years ago, chariots rolled along, and we saw on those pavements the marks of the chariot wheels as plainly as if they

had been worn during the past month. At the drinking t
tains on the street corners, we could see where the Pomp
stopped when he was thirsty. The stone at the orifice, wh
the water poured out, was worn away by the many app
tions of Pompeian lips.

We looked into the ovens as they were on the day o
eruption. The bakers were preparing their store of br
and we were shown the loaves which had been drawn
those ovens after resting there eighteen hundred years.
saw the shops of the wine merchants, the butchers, the ba
and the men of other occupations.

We saw the names that had been painted on the door-p
a little faded and dull, yet still legible. We sat dow
benches which were unoccupied for seventeen hundred y
and we entered the dwelling-houses where, two thou
years ago, the members of the family passed their daily
It was a picture of the past, and not of the present.

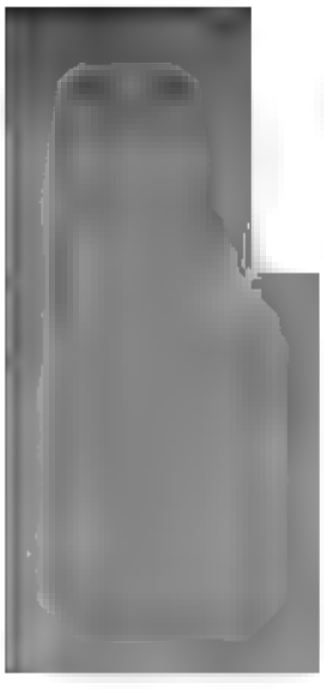
Pompeii was preserved, and not destroyed. To its inh
ant, on the day of the eruption it was destroyed; but fo
who now look upon it, and study its history, it has been
served.

The most complete bakery in Pompeii was in Herculan
Street, and occupied an entire house.

The inner court-yard of the house contains four mill
curious construction. At a little distance they rese
hour-glasses. Imagine two large blocks of stone in the s
of cones, the upper one overset upon the lower, and you
their construction.

The lower one remained motionless, and the other
turned either by a man or a donkey. The grain was cru
between the two stones. Sometimes the servants of
establishment turned the mill. At other times slaves
some misdemeanor, had their eyes put out, and then
were sent to work at grinding.

The story goes that, sometimes, when the millers
short of hands, they established bathing-houses around
mills, and the passers by who were caught in the trap ha



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DISCOVERY OF LOAVES OF BREAD BAKED 1800 YEARS AGO, AT POMPEII.

work the mill. In the establishment now referred to, the machinery was turned, not by men, but by a mule, whose bones were found lying near. In the stable of the mule the racks and troughs were standing. Near the bake-ovens were the troughs where the dough was kneaded.

There was one oven which remained unopened. It had two openings. The loaves went into one of these, in the shape of dough, and were taken out at the other opening baked. Everything seemed to be in a fine state of preservation, and the oven could be made use of again for a repetition of its work of eighteen centuries ago.

The oven when found was full of bread. Some of the loaves were stamped to indicate that they were of wheat flour, and others to indicate that they were of bran flour. The oven had been carefully sealed, and there were no ashes in it. Eighty-one loaves were found in it, a little stale, to be sure, and very hard and black, but lying in the same order in which they were placed on the 23d of November in the year 79. The loaves weighed about a pound each. They are round, depressed in the centre, raised on the edges, and divided into eight lobes. Imagine an American pie which has been marked with the knife as if for cutting before it is placed in the oven, and you have an almost exact picture of a Pompeian loaf of bread. I did not try to eat it, partly because I prefer my bread fresh, and partly because the loaves are considered too precious to be given or sold to visitors.

Whoever goes to Pompeii thinking to find a perfect city will be very much disappointed.

The ruins of Pompeii, as the old lady said about the ruins of the Coliseum, are very much out of repair. The walls of the buildings are mostly standing, but the roofs and doors, which were constructed of wood, are gone, having rotted away in their long exposure to the moisture. Everything whatever, of wood, planks, or beams, was turned to ashes: all is uncovered, and there are no roofs to be seen.

Almost everywhere you walk under the open sky; everything is open, and if a shower were to come on, you would

hardly find shelter. Imagine yourself in a city in process of building with only the first stories completed, and with no floorings for the second.

Many of the statues and works of art have been carried to the Museum at Naples, so that in the old city itself, there are, comparatively, few curiosities of a portable character. The sky, the landscape, the sea-shore, the walls and the pavements are antique, and it is only the visitors and their guides that are modern. The streets are not repaired, the sidewalks are not changed, and we walk upon the same stones that were formerly trodden by the feet of the Pompeian merchant and his slave.

As we enter these narrow streets we can almost think we are quitting the century we live in, and going back to the century that witnessed the birth of Christ.

When first uncovered, the paintings of the walls were as fresh as though they were made but a week ago, the ashes having preserved them perfectly. In a few weeks or months their coloring fades, and they become dingy and hardly visible.

The Pompeians were great lovers of art; every wall is frescoed, and the mosaics on the floors are an interesting study. Statues adorn the interior of the dwellings, and abound in the public places: even the ordinary utensils of the kitchen were fashioned in a remarkable manner, and far more artistic than those of the present day. The most ordinary utensils of the household are specimens of art that evoke the admiration of every beholder.

As one walks through Pompeii he sees much to tell him that advertising is not altogether an invention of the present age. Placards and posters enlivened the streets; the walls were covered with them; and in many places there were whitewashed patches of wall, serving for the announcements which the writers wished to make public. These panels were dedicated entirely to the public business, and anybody had the right to paint upon them, in delicate and slender letters, the advertisements which we now find in the columns of the newspapers.

Many of these announcements were of a political character, such as proclamations of candidates for public offices. Pompeii was evidently swallowed up just before an election. In reading the posters you will find that sometimes it was a noble, sometimes a group of citizens, and sometimes a corporation of tradesmen, who recommended some one to the offices of *ædile* or *duumvir*. Thus Furatus nominates Pansa; Philippus nominates Cuspius; Felix, and Valentinus, and his associates prefer Salvius. Sometimes the elector was in a hurry, and asked to have his candidate chosen quickly. Sometimes a dozen guilds, such as the fruiterers, the porters, the mule drivers, the salt makers, carpenters, and others, united to urge the election of somebody.

Rather curiously, we found on some of these placards that the sleepers declared their preference for somebody, and it puzzled us to know who were these friends of sleep. Perhaps they may have been gentlemen who did not like noise, or perhaps they were an association of tumultuous fellows who thus disguised themselves under an ironical title. They may have been a type of the class who are described in the present slang of New York as *roosters*.

There were advertisements of lost property, hotels announcing rooms to let, stolen horses, performances at the theatres, and various other things, such as we see in the advertising papers, and in posters on the walls at the present day.

There were some of these posters devoted to what we call *personals*. Of course they were obscurely worded, so as to be understood only by those for whom they were intended. One of my companions asserted that one advertisement read, "Julia, same place, six P. M., Tuesday;" and another said, "Scipio, come back; all will be forgiven;" and another was, "Marcus has gone west, will return next week."

I did not see these advertisements, and make the statement only on his authority. I might have been inclined to believe it had he not declared, with the most solemn visage, that he read an advertisement thus: "Secure me a suit of rooms on the Boston steamer tomorrow." This was too much; and I told him that business was played out.

There were inscriptions in reference to the cleanliness of the city; and some of them recalled, in terms too precise and definite for modern times, the announcement of the present day, "Commit no Nuisance."

Pompeii was not a large city; it contained only about thirty thousand inhabitants, and was rather a suburb than a great national dwelling-place. The Rome of that day was many times larger; and when we are considering the buried city, we must remember that we are considering a small hamlet rather than a large capital.

A volume might be filled with descriptions of Pompeii and its contents; the forum, the theatres, the dwellings, the tombs, the baths, the shops, the stables, the gardens, are all interesting. According to the histories, it was during a festival that the eruption took place. We may imagine the picture, that while the amphitheatre was crowded and gladiatorial combats were in progress, the earth shook, and the sky was dark with the clouds of smoke and ashes rising from the great volcano. The Pompeians rushed from the amphitheatre, and were overtaken by the shower of stones, and the deluge of ashes falling like a burning snow upon the streets; the dust fills the streets. Heaps of the burning ashes break through the houses, crushing the tiles and burning the rafters; the fire falls from story to story, and accumulates like earth thrown in to fill a trench. The amphitheatre is speedily ingulfed, and no one remains in it but the dead gladiators, and the prisoners enclosed in their cages, from which there is no escape. Those who have sheltered themselves under the shops, and in the arcade, were buried beneath the ashes and stones.

Skeletons are found everywhere, indicating how people were overtaken in their flight. Here is a fallen woman grasping a bag of jewels; near by is the skeleton of a man with a bunch of keys in one hand, and the remains of a bag of coins in the other. A woman holding a child in her arms took shelter in an oven, and was enclosed there. A soldier, faithful to his duty, remains at his post before the gate of the city, one hand upon his mouth, and the other on his spear, and in

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BODIES OF POMPEIANS CAST IN THE ASHES.

...ached in an oven with its bell still attached to its... Prisoners were found with their ankles riveted to iron... Everywhere skeletons have been discovered, and they ...re the anguish and terror the sufferers endured on ...of the eruption.

...moralists, those who consider that Sodom and Go... were destroyed as a punishment for their crimes, are ...on that Pompeii was also destroyed because of its ...ness. The discoveries in that city are, many of them, ...too far not to be described in public prints, especially ...id of the engraver's art, at the present day. Some of ...drops worn by the women were curious to behold ...were fashioned in forms quite as obscene as they are ..., and the same may be said of the chandeliers, and ...of the utensils used in ordinary life. Cu... e... ...seals are found that would hardly be suitable to in... ...day on the back of a letter, and there were paintings ...y of the walls that should be covered from fastidious

...in houses which in American cities are visited by ..., and whose locality is, to a certain extent, shrouded in ...ity, were boldly designated by various symbols cut ...e stones of the sidewalks and upon the lintels of the

In the autumn of 1876, new excavations have been commenced in Pompeii, and judge of the astonishment of the excavators, when, while digging for unknown treasures, they come to a second city beneath the one known to the reader. It has been buried there perhaps centuries before New Pompeii was built, under lava and sulphurous matter, and the architects, probably not knowing of the fact, erected their houses on top of those of their forefathers. It almost seems that Art, in the first-buried city, was far more advanced than in the latter. Marvels of art and architecture have been found, and when we enter one of those splendid edifices, and admire its paintings and statuary, we are struck with admiration for the great accomplishments of men who lived centuries before the birth of Christ.

Let us enter one of these houses, and see how they are built, and at the same time admire the freschi, paintings, and statuary which adorn the graceful abode of the ancients.

We enter the house by the *vestibulum*, or hall, and come into the *atrium*, a large square, paved with marble, inlaid with the richest mosaic of various colors. A row of pillars, adorned with the most beautiful freschi, border it on the right and left, and between them doors may be seen, which lead into bed-rooms. The two last rooms on the sides of this open space leave two small recesses, which are furnished in the richest manner, and probably served as small reception-rooms. In the center of this *atrium* is an *impluvium*, or small reservoir, generally provided with a fountain. Over this impluvium the roof is open, and the sky may be seen. Going onward, right opposite the entrance, we enter into the *tablinum*, which is not provided with a door, and allows a free view over the *atrium*. This room probably served for a large reception-room, as the most costly paintings and the richest furniture are found here. On the right-hand side of this room we find the *triclinium*, or dining-room, and on the other side a cabinet of curiosities and gems is found. Between this last apartment and the reception-room, a small passage is seen, which probably served for the slaves, as they were not allowed to go through the reception-

room of their master. These rooms all open on the peristyle, another oblong square, which has on either side a row of sleeping-rooms, which probably were destined for the afternoon nap of the old Romans. No beds are to be seen in them, only large, commodious lounges.

At the end of this peristyle, which also is adorned with pillars and statuary, and we may readily except flowers and plants of the richest fragrance, we enter into a second eating-room, for the Romans had one dining-hall for the winter and one for the summer, or one for ordinary, and another for festive occasions. A cabinet, dignified with the name of library, is, in most cases, on the right-hand side of this room, and in these apartments have been found many rolls of papyrus (the reader will remember that the art of printing was not invented before the fifteenth century after Christ), containing manuscripts. On the other side was generally the kitchen. From this last eating-room we enter into the *viridarium*, the garden. Modern imagination can scarcely imagine the beauty and luxury of this cool place of resort. Fountains of fragrant waters here filled the air with sweet perfume, and we do not wonder that this place was devoted to a rest after dinner, and the abode of love. The wall, which terminates the garden and the house, is screened by the most beautiful plants, which overshadow superb statuary, and we may imagine the beautiful view which may be had from the *atrium*, through the different rooms (as no doors interfere) to the green background, variegated by the colors of flowers and the rich curtains, whose folds partly conceal the *tablinum* and the second dining-room.

The houses consist generally of one single floor, unless they are very large, and we may easily see, from the plan here described, that there is space enough for the comfort of all the inhabitants, and the enjoyment of the numerous guests.

If we wished to give a description of all the treasures found in those ancient abodes, we might fill volumes, and therefore we will only mention some of the most remarkable features of the recent excavations. One picture has been exhumed at Pompeii, representing the Three Graces, which Raphael, of

course, could not possibly have seen, yet the two compositions, although of different dimensions, are precisely the same—in grouping, in form, in expression, and even in charm. Now, not even a sketch of the picture was known until long after the middle of the eighteenth century, while the actual picture is a modern revelation altogether. Another fact was discovered: Raphael, copying a statue, applied the very same process to his painting which had been employed by his predecessors fifteen centuries previously. Within the last few years, forty figures have been redeemed from out these artistic tombs, which were evidently details of an immense composition, intended for the adornment of a theater or banqueting-hall, besides those, pictures of lightly-clad figures, floating through the air, relieved against brown, black, and crimson skies, with masses of carnation-cloud beneath their feet, and gems hanging, so to speak, around them, enveloped in robes of hyacinth, blue, green, and so on, the colors appearing to be laid thickly on vitrified surfaces. It is a wonder to all artists how those colors were laid on, not only as far as the magnificent coloring goes, but even in what way it was done. We find painting in relief on the smoothest surface of white marble; statuary even has been painted in the most masterly way, and we see auburn and blonde hair painted in a way which deceives even the sharpest observer; if we did not know better, we would think that the statue had natural hair,—all the gloss and the true tinge glowing through it is illustrated to absolute perfection.

The Neapolitan chemists, of course, are very eager to unravel this secret of their forefathers. Many a piece of painting has been analyzed; many a fragment of painted beauty has been destroyed by acids. However, till now, they did not succeed, and perhaps the art will be for ever a mystery to us.

Upon the whole, as this antique city is thrown more and more open to modern light, it proves to be the richest memorial extant of Grecian genius, as represented by an art so different from, and still at the same time so kindred to, sculpture. In most other classic centers, while the form and the

purity have survived, the color and the splendor have faded; but here, as chamber after chamber, gallery after gallery is opened, a new beauty of the past appears, freshly vivified by the long-excluded light, and, as we are assured, labyrinths of interest remain yet to be explored.

A wine-shop was lately found at Pompeii, roughly ornamented with imitations of marbles in fresco. Over the podium of the front room runs a band of stucco, with four groups or scenes painted on a white ground. The first, on the left, represents a young man kissing a woman dressed in yellow garments, with black shoes. She says, "Nolo, cyn myrta" • • "I don't want to be kissed; go to your Myrtalis." The second scene represents, very likely, the same woman talking to Myrtalis, who says, "Non min, est." They both point their fingers at a third female, bringing in a great wine-jar and a glass. She says, "Qui vol. symat oceane, veni. bibe," an invitation to partake of the drink. The third scene represents two gamblers seated, having the chess-board on their knees, on which several latrunculi are seen disposed in rows of different colors, yellow, black, white. The one on the left is just throwing the dice, and says, "Exsi," "I won." The other answers, pointing to the dice, "Non tria, duas est," "You have got two, not three." Both fight in the fourth scene. One says, "Non it a me, tria, ego, fvi," "I did not throw two, but three. I have won." The other answers, "Orte fellator ego fvi," "You ———! I have the game." At this moment the shop-keeper comes in, and pushing them outside, says, "Itis, foras, rikastis," "Go out to quarrel."

XII.

VESUVIUS AND ITS ERUPTIONS.

THE GREAT ERUPTION OF VESUVIUS. — WHAT IT DID. — THREE CITIES WIPED OUT. — LAVA AND ITS CHARACTER. — GOING TO THE MOUNTAIN. — SKIRMISHING WITH GUIDES AND BEGGARS. — ARCHITECTURAL STEEDS. — A HORSE WITH A HAND RAIL AROUND HIM. — COAT-HOOKS TO LET. — A MOTLEY CROWD. — HOW AN AMERICAN WAS MOUNTED. — A NEW MODE OF SPURRING. — THE ROAD FROM RESINA. — BURNING LAVA. — CROSSING THE LAVA BEDS. — CLIMBING ON FOOT. — HAPS AND MISHAPS. — AN ENGLISHMAN'S ACCIDENT. — LIGHTING A CIGAR AT THE CRATER. — SUFFOCATED BY SULPHUR FUMES. — DOWN AMONG THE ASHES. — A LONG FALL AND SLIDE. — IN HERCULANEUM. — UNDERGROUND BENEATH THE CITY. — "LOOK HERE." — HOW THE CITY WAS DISCOVERED. — THE ERUPTION OF 1872. — HORRIBLE SCENES. — EXTENT OF THE DESTRUCTION.

THE eruption of Vesuvius that buried Pompeii destroyed Herculaneum at the same time. Some historians contend that the occurrences were not identical in point of time; but, after all, it makes little difference to us whether the two cities were simultaneously destroyed or not. The probability is, and it is pretty well settled, that while the ashes and stones from the crater of Vesuvius were blown upon Pompeii, the lava and mud flowed in the direction of Herculaneum, and covered it. A third city, Stabiæ, was destroyed at the same time — a fact which is not generally known. Castellamare, a well-known summer resort near Naples, stands on the site of Stabiæ, whose excavations, not having promised very well, were filled up soon after they were begun.

The lava which flows from a volcano during violent eruptions is a composition of melted stone and oxide of iron. The stone is mainly feldspar and hornblende. There is a good deal of sulphur also in the lava when it rises in the volcano, but the most of it is thrown out in the form of sulphurous fumes. The lava very much resembles the slag or scoriæ

flowing from an iron foundery, and, when suddenly cooled, it assumes a glassy character. When it consolidates or cools, it forms what are known as volcanic rocks. If the streams of lava are cooled under no other pressure than that of the atmosphere, they assume a porous appearance. Lava, cooled under the surface of the water is much more compact, and where it is cooled under heavy masses of earth and rock, it becomes quite solid.

Our party visited Herculaneum after making a journey to Vesuvius. We wished to see the volcano first, and afterwards to explore the city which it had destroyed. We rode out of Naples, after our usual struggle with the hackmen, and at Resina left our carriage to proceed on horseback. About half the population gathered to see us off. A staff, or heavy stick, is considered indispensable, and each of us purchased one from the crowd of boys and men, whose wooden material was sufficient for starting a small forest. I think our selection was made from about two hundred and forty-seven sticks, which they simultaneously presented in our faces, and with the demands of the venders and the piteous appeals of forty or fifty beggars, we had, for a few minutes, a concord of sweet Italian sounds.

As soon as we had bought the sticks we used them to clear away the crowd, and as we were all young, reasonably powerful, and as indignant as we were powerful, we made a clear circle around us in a very short time. Then we bargained for animals on which to ride. I obtained a horse, something like those with which the famous Mackerel Brigade was equipped.

My horse had no hand rail along his deck, by which to cling on, though his back-bone had a close resemblance to a rail with a great many knots on it. He had an elegant selection of knobs sticking out all over him, on which to hang superfluous coats and other garments. One of my companions offered to charter two of the knobs as coat-hooks, but immediately withdrew his offer when the horse which he was to ride was brought out. Mine looked like a frame with a skin drawn

over it, but his resembled a frame without any skin. I suggested that, when he got through the journey, he might sell out his horse to be used as a lantern for a light-house, and that the ribs would give a peculiar effect to the rays of light.

The third man of the party obtained a mule that had lost one ear, and had his tail eaten off by the rats. The beast had a habit of going backward faster than forward, and before we had gone a mile we asked the guide to shift the saddle so that our friend's face could be turned towards the stern of his craft; but the guide insisted that such a thing had never been done, and that the mule would be all right if the man behind him would give an occasional prod with his stick. The fourth man was mounted on a donkey, or mule, or horse; I cannot say exactly what the animal was, but he seemed to be a mixture of the three, with a small infusion of bull-dog and rhinoceros.

He had a hide that would turn a six-pound shot, and as for cudgelling, he rather enjoyed it than otherwise. His rider had brought along a pair of spurs, which he picked up a day or so before in Naples. He proposed to show us his skill in mulemanship, but the mule was so small, and his rider's legs were so long, that the latter could not reach the beast with his heels. I suggested a dodge which I had seen in practice before. With the spurs on his heels my friend found his feet too far aft, when he raised them, to do any good; I accordingly suggested that, if he buckled the spurs on just below the knees, he would find them to be of more advantage. He tried it with one spur, which had a perceptible effect on the activity of the animal; but, unfortunately, the activity was sidewise, or backwards, or in circles, and not straight ahead. The beast either sidled along the track, or else went in quick plunges, in a way that was very uncomfortable. Our whole cavalcade, considered as an average, did not get along very fast, and every fifteen minutes we had a grand kicking plunge all round; but we were all sufficiently accustomed to the saddle to save ourselves from being thrown. We made about three miles an hour each along the route, or fifteen miles an

hour for the five of us, which, on the whole, was not to be complained of.

The road from Resina winds along sometimes over the lava beds and sometimes on a carriage-way, constructed at great expense, but now almost entirely useless. In some places the lava though it had been lying there several years, was quite warm, and there were cracks, from which the heat steadily issued. Lava requires a long time for cooling, and sometimes, where it is of great depth, it will not cool enough for one to walk upon it within two years after it has flowed from the mountain. We got along very well, assisted as we were by the native loafers, who followed us, and occasionally took a turn at, or, rather, with, our animals' tails. With the mild beasts they got along very well, and I think the animals would have had their tails twisted off before breaking into a run; but the vicious beasts did not like the arrangement, and they either quickened their pace, or let fly their heels at the twisters.

My horse had been warranted to me as a safe beast, and after we had fairly started, I found that he was pretty nearly as safe as a dead horse. When he began to climb the mountain, he really seemed to be more dead than alive, and no persuasion, whether with my stick or heels, could induce him to break into a run. When we reached the foot of the cone, half a dozen boys offered to hold him; but I concluded he had better hold the boys — one was quite sufficient to keep him quiet while we made the upward journey.

The real work of climbing Vesuvius began at the foot of the cone. The beasts that had brought us would not go beyond this point, and so we dismounted. After refreshing ourselves with a bottle of villanous wine, that tasted of sulphur, sewer-water, and other delightful things, we removed our coats and started upward. There was a fresh lot of loafers, who wanted to assist us. They had chairs strung upon two poles, by which four men could carry a person to the summit. The chairs were very good things in their way, but I preferred to walk, and so did my companions. The path sloped at an

angle of forty-five degrees, and was made up of ashes and stones. The natives had arranged the stones in such a way, that a person could step from one to another without great difficulty, only that it happened that the stones were so far apart that they occasionally needed a pretty wide step.

Finding I would not be carried in a chair, the loafers importuned me to be dragged up with a strap or rope. A stout fellow went in front of me, and continually pressed me to seize a strap which he invitingly pushed before my nose. I repeatedly told him that I did not want it; but he stuck to me half way up, and then concluded I was a bad bargain. As I would not accept his offer of assistance, he proposed that I should give him half a franc to leave me. This I refused to do, and told him he might go to the summit if he liked, and enjoy the scenery; but he wanted no summit, unless he could earn something. He started back down the mountain, and I had the pleasure of seeing him miss his footing, and roll to the bottom. I learned afterwards that, most unfortunately, he did not break his neck, and was not seriously injured.

I have had a good deal of climbing in my life, but that was the worst thirteen hundred feet I ever made at one time and in one piece. I had to stop several times on the way up, in order to take breath, and something with it to make the breath go down. One of my friends suggested giving it up when near the summit; he said there had been a great mistake in the statements of the guides and guide-books. I asked him how it was, and he said, "We were informed that donkeys go only to the foot of the cone, and not to the top; but it is my impression that there are now four of the greatest donkeys in the known world trying to reach the summit." We forgave him for his joke, and, after a mouthful of bad wine, he felt better, and proceeded.

For a good deal of the distance where we climbed it seemed as if we slipped back one step for every two or three that we took forward, and in some places we slipped back two steps where we went forward one. An exhausted Englishman was just ahead of us, and his misery gave us great comfort.

One of the Italians had a leather strap fastened about his own neck, and persuaded the Englishman to take hold of it. Another Italian went before the first, and held on to a strap around the first man's waist. Another Italian went behind the Englishman, and pushed him ahead, so that he managed to get along very fairly.

At a critical moment the rear Italian slipped: the Englishman tripped next, and pulled down the two fellows in front. The result was, that the whole four were doubled up in a heap, rolled over in the ashes, and lost about fifty feet of distance before they could recover themselves. For about a minute there was a confused mass of legs, arms, and curses, some Italian and some English, which drew forty shouts of laughter from the spectators. The enraged Britisher did not like the journey, and gave up the attempt as a bad job. We were sorry for this, as we expected him to be suffocated in the sulphur fumes at the top, and afford us an opportunity to observe his agony.

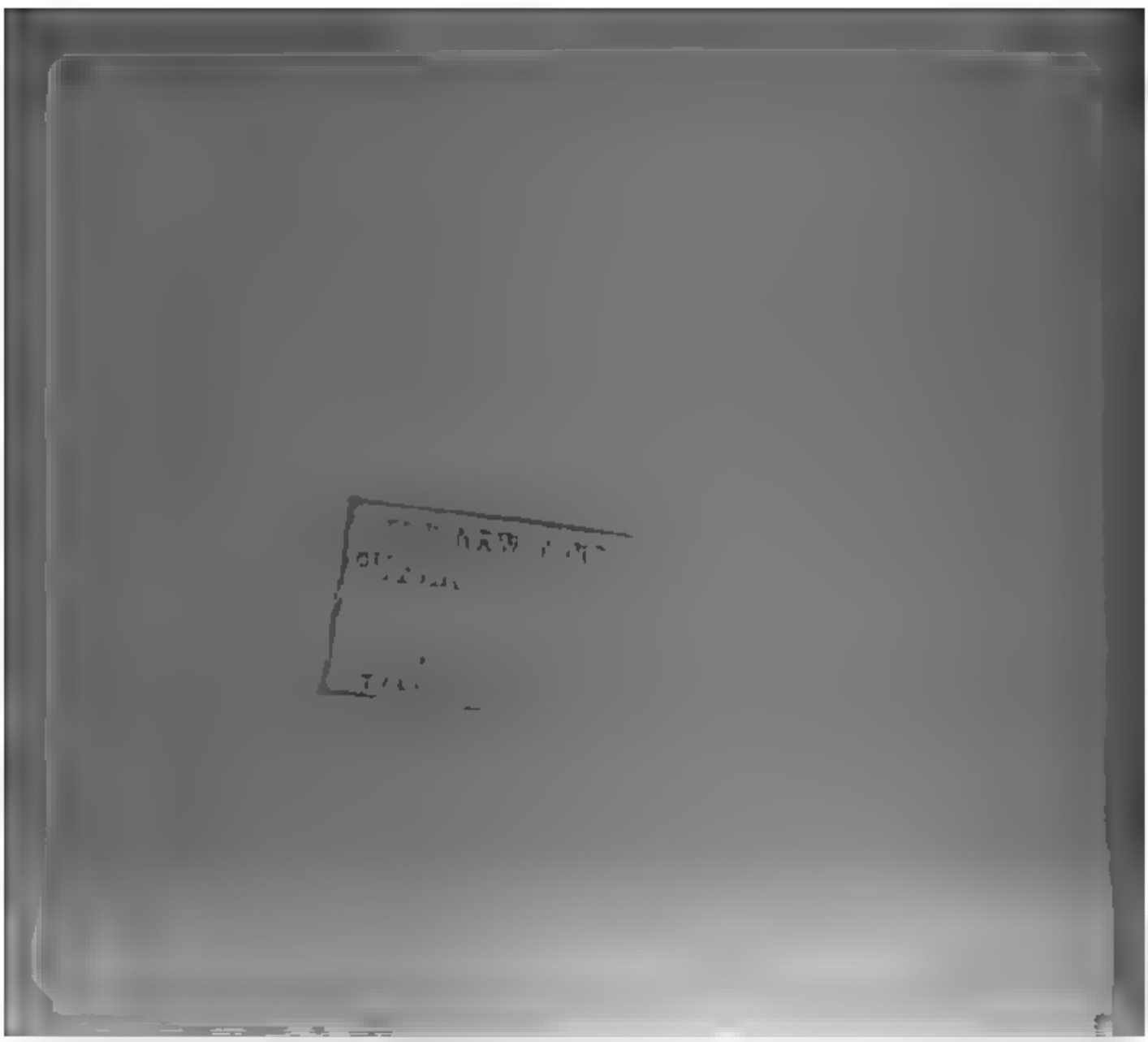
When we reached the summit we sat down to rest, and take a little wine. Then the guide led us around to the crater, where the fumes of sulphur and clouds of steam were rising out of the volcano, and around a great, yawning gulf, that was a complete mass of fire. We had to hold our kerchiefs over our noses to save us from suffocation, and even with this it was almost impossible to breathe. The crater, at that time, was comparatively small, — at least, so they told me, — but it seemed to me a very fair crater for all practical purposes. The flames filled it from side to side. Their colors were white, purple, yellow, and crimson, and they threw up clouds of smoke and steam. It seemed as if the summit of the mountain was hollow, and might easily be broken in. If a man should fall into the crater, his chance of escape would be as good as if he was dropped into the middle of the Atlantic Ocean, with a twenty ton anchor fastened to his neck.

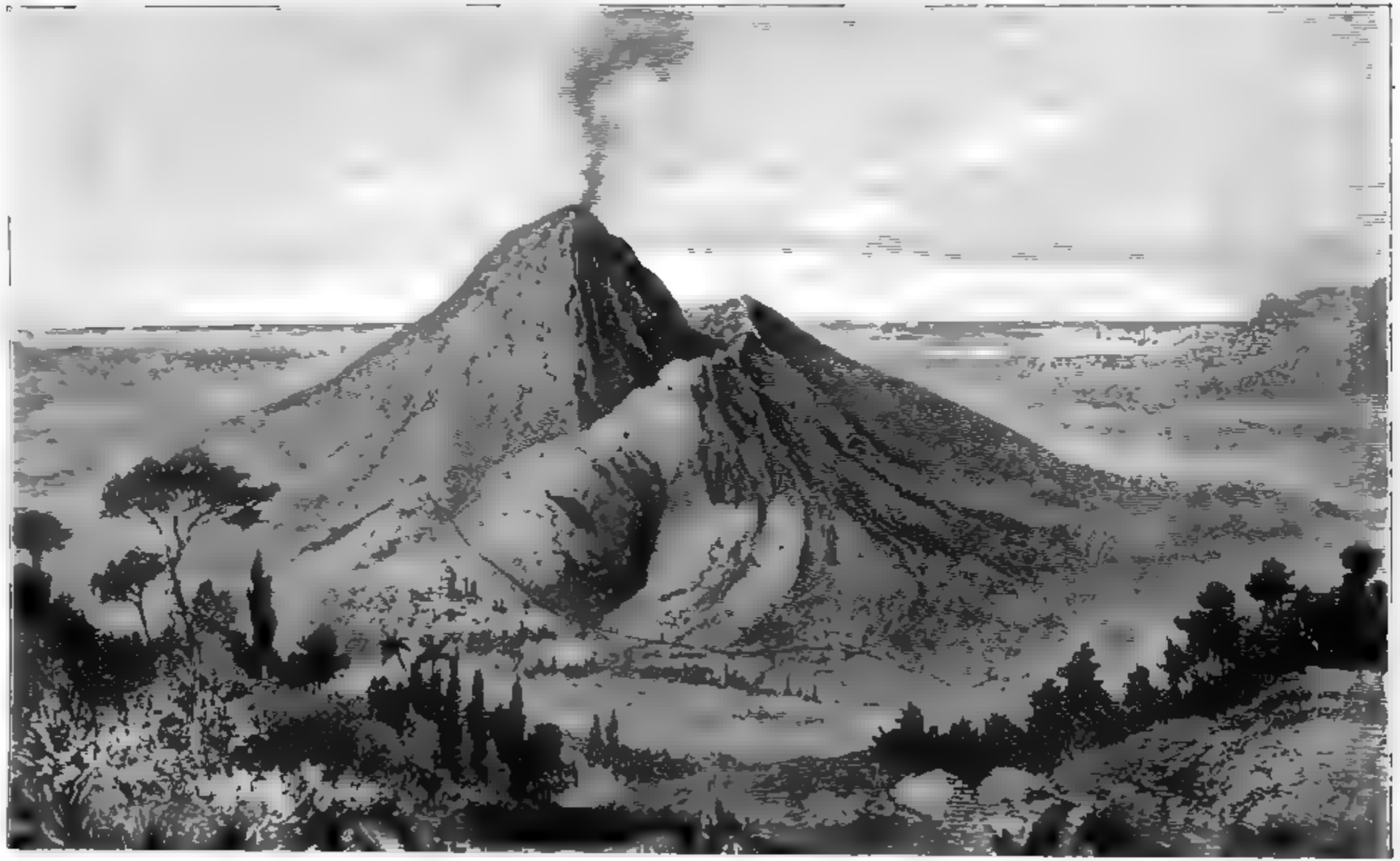
It seemed to me as if there might be an eruption at any moment, and I wanted to get away from the place; but the guide said there was no danger, that the crater always filled

up before an explosion, and that they knew days and weeks beforehand when it would occur. To convince me that there was no danger, he said that he had a family to support, and wanted to live, though I could see no reason why, and he had no hesitation in going close up to the edge. Although I had no family to support, I knew a man who had one. I therefore concluded to do as he did, and so crept up and looked over, holding the kerchief all the while to my face.

A very brief gaze was sufficient for me, not because the sight was less grand than I had expected, but because the fumes of sulphur were so strong that I feared I might faint, and in falling, drop into that confounded hole. There are various modes of death which I should consider disreputable, and dropping into a volcano is one of them.

We went so near to the fire that I lighted my cigar at the flames of Vesuvius, and as I was quite weary I enjoyed the cigar with a great deal of relish. We cooked some eggs which we purchased of an Italian speculator. He had brought them up at a venture, and provided himself with salt and bread, and a few bottles of wine, so that we were able to make a comfortable meal. Our appetites had been sharpened by the labor of climbing, and we made a hearty repast, the more so as a view was displayed before us which I will not easily forget. Gold and blue, that brilliant gold of the sun, a whole world of cheerful beams, and a splendid azure-blue is lying upon the sea under us. That is a sky so magnificent, so many-colored, as no other country has ever seen. Yonder lies Capri, there Procida, and at a little distance Ischia, all floating upon the water, like so many boats, adorned with many-colored flags, all splendor, all charm. This wreath of villages and cities, washed by the bay of Naples, glistens like marble, and yonder, where the sea pierces so deep in the land, is Naples. That charming city is surrounded by landscapes of the brightest hues, blue, green, life and joy! The Neapolitans, proud of this gem, call her "a piece of paradise lost upon the earth." A view of the bay of Naples from the top of Vesuvius is probably the most charming one upon earth. The





great difficulty of the ascension, and the still greater annoyance of the beggars and the enormous number of curious visitors, has led a company to project a railroad, which does away with all such troubles. The distance from the suburbs of Naples to the top of Vesuvius is twenty-six miles, twenty-five of which are to be laid with ordinary railroad tracks, and the distance from Atrio del Cavallo to the top, which is the steepest stretch, being three miles, is a wire-rope road, which prevents the cars from sliding back over the steep plane. The plan is made to have the whole road covered with a vaulted roof of lava, to a distance of about one hundred feet from the crater, which will at the same time divide the streaming lava into two tributaries, running on either side of the road which is built of lava also, and is elevated. The model of the road is the same as that of the *Rigi*. One of the stations of the road is the observatory of Prof. Palmieri, who here feels the pulse of the mountain. He showed us, with the greatest courtesy, the different scientific instruments of which he makes use for his investigations. It would take too much space to describe them here; let it suffice to say that they enable the professor to make his calculations to a nicety, and that we really may say that he "feels the pulse" of the mountain. He not only knows what is going on at the moment in this great reservoir of lava, but he is able to predict an approaching eruption.

Going down the mountain was much easier than going up. We did not go down at the same place where we made the ascent, but went a little to one side, where we could walk down through the ashes. The first step or so is a little trying to the nerves, but after two or three steps you acquire confidence and then let yourself out. All you need to do is to stand erect, throw your head back, and start off, putting one foot before the other in a dignified sort of way. The ashes are generally dry and dusty, but at the time of my descent they had just been moistened by a slight fall of rain, so that no dust arose from them. Our feet settled in the ashes up to the ankles, and at every step we went forward six or eight yards. It took us an hour and a quarter to climb the mountain, and we came *down in seven minutes*, including a halt on

the way to make love to an English girl, who had slipped, and was unable to pick herself up. We assisted her to her feet, and lost a minute or two in our work of gallantry.

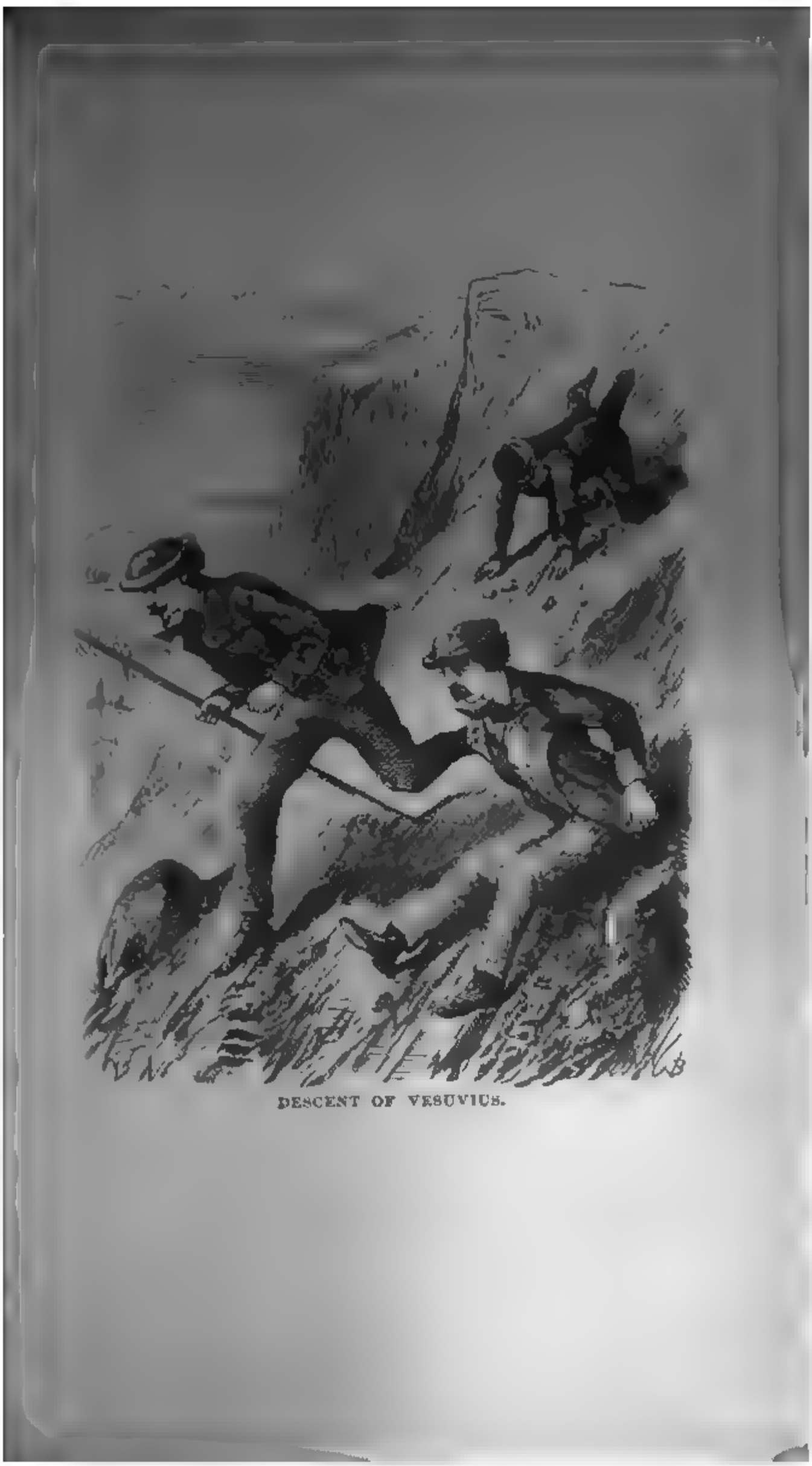
A countryman of ours who attempted to come down just behind us was not quite as successful as ourselves. He managed to pitch forward and turn a very pretty somersault; but the exercise did not improve his personal appearance or his temper. When he brought himself to rights, and reached the place where the horses were standing, he was very much dilapidated, and as cross as a bear with a chewed ear.

It is hard work to ascend Vesuvius, but it is jolly fun to come down.

We mounted our animals and came away. On the steepest part of the descending road, we tried to get up a race, thinking that the laws of gravitation would help us. Part of the beasts were induced to run, but there were two or three out of which no speed could be made faster than a walk. Even a descent as steep as the roof of an ordinary house had no temptations for them, and I wanted to try the experiment of flinging them over a precipice, to see whether they could be started into anything like a respectable pace. I have my doubts about it; and had they been flung from a perpendicular cliff, I think they would have come down through the air as majestically and as calmly as a parachute descends from a balloon.

When we reached Resina, we rode to Herculaneum. The modern discovery of this city resulted from digging a well in the year 1709. The site of the city had been lost, owing to the great depth — nearly one hundred feet — of the solid material which covered it. Properly speaking, Herculaneum was destroyed by liquid mud, rather than by burning lava. Since the destruction of the city, there have been six different overflows of lava, so that for all practical purposes the site is covered with this solid material.

When the well referred to was being made, the workmen came upon another well; an ancient affair, nearly eighty feet from the surface. Several works of art were brought to light,



DESCENT OF VESUVIUS.

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SEARCHING FOR RELICS AT HERCULANEUM.

for some reason the government of Naples prohibited the excavations. Thirty years later, they have been renewed, and have since been prosecuted at different intervals. At the present time the excavations are continued with much zeal, and startling discoveries are being made.

As is the case with Pompeii, so over ancient Herculaneum a new city has been built. Underground passages have been explored like those of a mine, without uncovering them to the light of day. One great difficulty of the excavations is that the hot flow which, at the time of the great eruption, was covered with ashes, Herculaneum was covered with pool lava, which, if not exposed to the air, requires from one to two or three years to cool off, but then it is almost as hard as flint-stone. It is easily to be seen that under such circumstances the excavations but slowly progressed; the more so, as the digging has to be done very carefully, so as not to mar the objects, for which the excavation properly is done.

It is not often that articles are found at a height above ten feet from the floor, as their weight naturally carried them downwards through the soft mass of ashes. The digging is therefore rapidly prosecuted until the uniform above level has been attained. After this, the workmen carefully examine every piece of lava which they extract by small portions. As soon as the experienced eye of any worker recognizes the indications of a mold being formed in the lava, labor near that point is stopped, and tamping irons are cautiously inserted to make two or three vents in the cavity. Then liquid plaster is poured in; and after being left sufficiently long to harden, the lava is taken away, and the cast is removed.

In this way some curious facts have been brought to light. Two skeletons were found in close embrace, the teeth perfect, indicating youth in its prime; skeletons of a young man and maid. They had fallen together in their flight, and death had wedded them. There was a mother with her three children, hand-in-hand, who tried vainly to outrun death. Perhaps the mother, singly, might have done it, but she could not leave her children. Plenty of food for sad thought is furnished in

remembering that at Herculaneum and Pompeii, six hur skeletons have already been exhumed!—many in such posi and circumstances as to suggest very touching episodes ac panying the final catastrophe.

The skeleton of a dove was found in a niche overlookin garden of a house. She had kept to her post, notwithstar the shower of hot, death-dealing lava. She sat on her through all the storm, shielding the egg which was taken beneath her.

The streets of Herculaneum are all paved with lava, ju the streets of Naples are paved to-day. One street is than thirty feet wide, and furnished with raised sidew The houses were mostly of brick, and in general appear and structure like those of Pompeii, which we desc before. Magnificent pieces of art were taken out of them it is to be deplored that the paintings, as a rule, fade as as they are exposed to the light of day. Many statues busts and pieces of furniture claim our highest admira they are admirably executed, and evince a highly-culti taste. Various musical and surgical instruments, and b and many utensils belonging to the kitchen and toilet, cal attention, especially those of the kitchen, the utensils l very variegated, and mostly manufactured of copper lined silver. Many imitations of precious stones have been fc they naturally excite the curiosity of the chemist, who is to know how the old Romans produced them. Most of articles are now exhibited in the Museum of Naples, v the paintings are kept under glass, which precaution pre the fading of the brilliant colors as much as possible.

Herculaneum possessed a theater, which claims our gre attention, as it is the most important building discovered was able to contain eight thousand persons. Its wall highly decorated, and its floors and pillars were construct different colored marble.

Signor Fiorelli, the Italian engineer who supervises th cavations at Herculaneum and Pompeii, claims that Po did not contain more than 12,000 inhabitants at the ti

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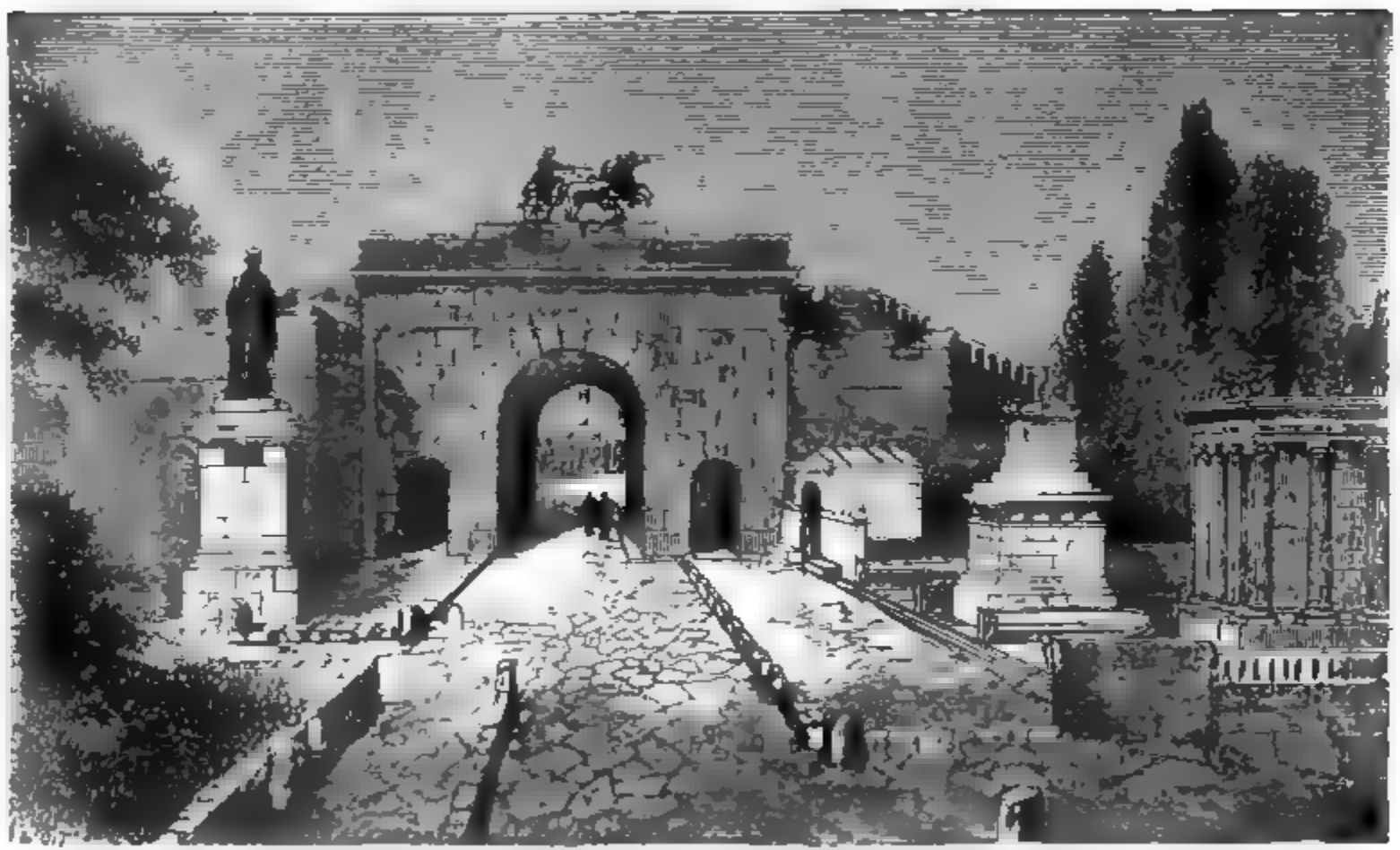


THE GATE OF HERCULANEUM AND STREET OF TOMBS.

eruption, although it has generally been supposed that the population was from 20,000 to 50,000.

Eight gates have been discovered, and the roads outside of them are lined on each side with tombs of considerable size and architectural pretension. The street of tombs, before the gate of Herculaneum, was probably the principal burial place of the city; and the sepulchral monuments adorning it, give evidence of the refined taste and great wealth of the prominent inhabitants. The streets, which, for the most part, run in regular lines, are, with some exceptions, barely wide enough to admit a single vehicle. Five of the main streets have been partially or wholly traced, and with these a regular system of minor streets appear to have been connected. The thoroughfares, with a single exception, terminate in or traverse the western quarter of the city, which is the only part yet completely explored.

The Italian government at present liberally assisting the excavations, the space now laid bare measures about 670,000 square feet, or one-third the whole area occupied by the city. Signor Fiorelli calculates that, making the excavations on an average twenty-five feet deep, and employing eighty-one laborers daily, the whole city will be unearthed in 1947.

Our descent into Herculaneum was by a staircase opening from a small house, where we found a number of guides in uniform. We paid our two francs each, and were remitted to the care of a guide, who pretended to speak English, but, to our great amusement, we soon found out that the whole extent of his English vocabulary amounted to: "Look here!" which precluded every explanation given in Italian. His knowledge of English only tended to make his Italian sound very funny indeed.

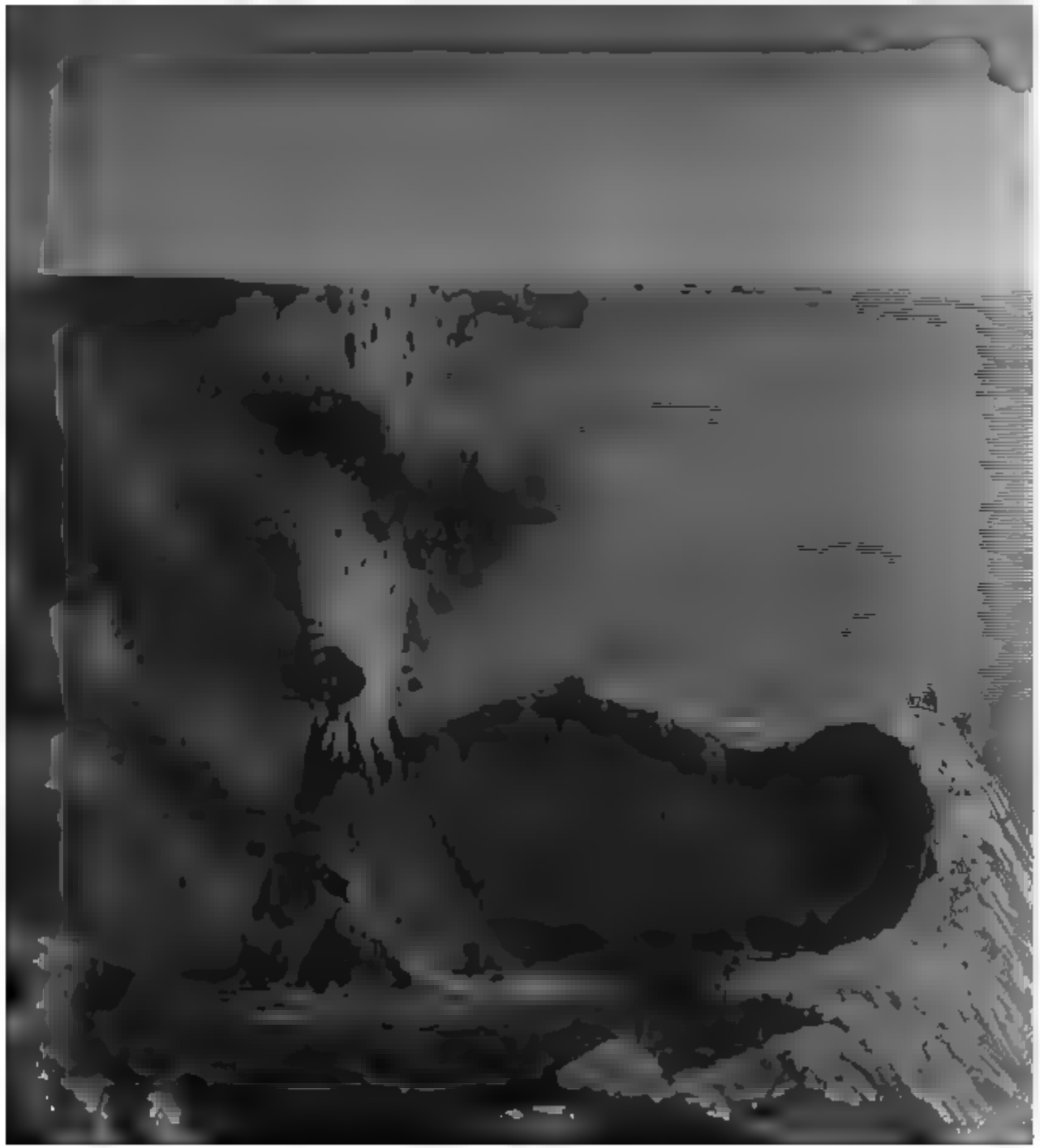
After we had seen all that was noteworthy, we mounted the steps into the open air, and returned to Naples. When passing Mt. Vesuvius, our guide told us, that indications of an eruption had been observed, and really in the following year the eruptions came. It did much damage and

attracted many visitors to Naples, but it did not equ extent or magnificence the great eruption of 1872. This break began on the 23d of April, and was at once the gra and most terrible of all the eruptions that have occu during this generation.

For some days previous to the outbreak the mountain indications of approaching activity, and when the eru began, hundreds of people observed it from the old lava between the observatory and the town of Resina, and of them remained there during the whole of the nigh April 25. Early the next morning two great seams o under these spectators' feet; hot sulphurous vapors enve them, and as they sought safety in flight, great rivers of rushed out of the newly-opened craters, and threatene frightened sight-seers with speedy destruction. Some f the earth under them too hot to be walked upon, and, f down, perished where they were. Others were suffo by the gaseous emanations from the earth, and still o were so injured that they died after reaching a plac safety.

In the towns and villages around the volcano the struction of property was very great, but the people g ally escaped by timely flight.

In all the towns the terror was wide-spread. Nine dis craters were opened, and lava streams, some of them six feet deep, ran down the sides of the mountains, destro everything in their paths. Several of the villages almost entirely buried in ashes, as ancient Pompeii w the eruption previously described. Even in Naples, p were almost smothered with the shower of dust, cinders sand that poured down for days. Every window was closed, and every traveller through the streets was pelled to protect himself by carrying an umbrella; and were serious fears, on the part of the timid, that the tiful Italian city of to-day was to play the tragic par Pompeii in a repetition of the terrible scenes of eigh hundred years ago.



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Many people lost their lives, some in consequence of remaining to protect their property, and others from venturing too near out of motives of curiosity. At one time a group of fifty or more people were surrounded by the lava, and burned to death in sight of those who were powerless to aid them. They were standing on a little hill, and did not perceive, until too late, that the lava had flowed around it, and placed them on an island, as it were, with a red-hot river all around them. Many others were burned by the lava and the hot blasts which came from it in various parts of its course. A gentleman who witnessed the eruption thus describes the scene in a letter written from Naples on the 27th of April, 1872 —

"Yesterday morning I went out to get a carriage to go up Mount Vesuvius, and on my way I was asked by a respectable looking man in the street if I had heard the news of the night. He then told me that hundreds of people, who had gone up the night before to see the burning lava in the Atrio di Cavallo, were dead. I had seen the mountain at eleven o'clock the night before, when there was a stream of lava running from the top of the cone into the Atrio — that is, the valley between Vesuvius and the adjoining hill, the Somma, where there seemed to be a lake of fire. Later in the night there was a tremendous eruption, a large crater opening suddenly between the Observatory and the Atrio di Cavallo, across the path of the visitors, it is said, of a mile in diameter. We started from Naples at eight o'clock. The view of the mountain was magnificent. An enormous cloud of dense white smoke was ascending to an immense height above the mountain, like great fleeces of cotton wool, quite unlike any cloud I ever saw. I could see the lava rushing from several openings to the right of and above the Observatory, but below the cone. The lava was still flowing from the cone into the Atrio, but no ash or dust was thrown up. We drove on to Resina, where the population were in fearful excitement, not knowing what to do, and apparently apprehensive of instant death — everybody making signs to us, and telling us to go back. We went on to the Piazza di Pugliano, where we

were stopped and told that no one was allowed to go up the mountain, by order of the police. However, after some expostulation, I took a guide on the box and started again.

"A few minutes afterwards we met a cart bringing down a dead body, and as we went on we saw other bodies — at least twelve — of which one only appeared to be living. They were frightfully burned on the face and hands, and some, which were carried on chairs, in a sitting position, were very ghastly objects. Further on we met people — officials, apparently — coming down, all warning us to go back. At last, when we had arrived at an elbow of the road not far below the Observatory, we met the officer who has charge of the Observatory, who said we could not go on; that the danger was imminent; that the lava was running across and down the road before us; that he had orders from the prefect of Naples to prevent any one ascending, and that we could not pass. My coachman was getting a little anxious, though I will do him the justice to say he was not afraid; so I consented not to take the carriage beyond a turn in the road above us to the right, especially as I did not wish to meet the lava in a narrow road where we could not turn the carriage. We left the carriage there, and ascended on foot with the guide by a path straight up the mountain-side.

"At length we stood on the edge of the flat ground reaching to the foot of the cone. Currents of lava were running down on both sides of us far below; the craters from which they flowed were hidden by the smoke; clouds of smoke were ascending from the top of the cone, and the lava still pouring down the Atrio. The roar of the mountain, which we had first heard at Portici was now tremendous, continuous, and unlike anything else I ever heard, — millions of peals of thunder rolling at the same time, — when suddenly, about noon, there was a cessation, with a low, rolling sound; and one heard the ticking and rippling of the lava currents pouring down the hillsides below. Then, in about a minute, came a deafening roar, shaking the ground under our feet; and a new crater burst forth just on the other side of the Observatory, as it seemed

fire, and dense clouds of ashes and stones were thrown up into the air on the left hand of, and mingling with, the great white cloud, making a great contrast with the dark-brown dust and ashes, which rose perpendicularly to an immense height. The roaring continued and kept on increasing till it became deafening, and I began to think it might injure our ears. We stayed there about an hour and a half.

"The scene was magnificent, the smoke occasionally clearing away and giving us the view towards the Atrio, that towards the cone being always clear; but as some of our party feared that the ground might open under our feet, and that we might find ourselves in the midst of a new crater, I at length reluctantly sent the guide to bring up the carriage. Had I been alone I should have staid there till the evening. When we had gone down a short distance the same phenomena again appeared. The sudden cessation of the tremendous roaring, the clicking and rippling of the falling lava, and the low muttering became then again audible; then the fearful roar, and the shaking of the ground, and another crater burst forth on the flank of the mountain, below the Observatory, sending up clouds of dust and ashes, which rolled over and over till they reached an enormous height, but quite separate from the other clouds. All this time the sun was shining in an Italian sky without a cloud.

"After stopping some time to admire the scene, we continued our descent; but before we reached the bottom of the hill we saw the lava from the last crater tearing its way down through the vineyards to our right with wonderful rapidity. Just an hour after we left the top of the hill the cone commenced sending up torrents of stones, which fell in all directions: but whether the red-hot hail reached our position on the height I know not. When we reached Resina it was curious to see the congratulations for what they thought our escape on the faces of the people. The uncertainty and the panic were gone, and they were steadily packing up their beds and the few things they could carry, and starting with every sort of conveyance to put their guardian saint, St.

Gennaro, between them and the danger. When I started from Naples I expected to find all the world at the top of the mountain; but, to my great surprise, there was not a single stranger there — only the few persons employed in bringing down the dead. I believe the police prevented any carriage passing after ours. The awful roaring of the mountain continued and increased till midnight, when it ceased, and only roared again for a short time about four o'clock. To-day the mountain is quieter, and the Neapolitans are a trifle less pale. The view of the mountain at midnight was grand in the extreme."

Several villages were destroyed in this eruption, and many acres of vines were covered with lava and ashes. But as soon as the eruption was over, many of those who had fled returned to whatever of their old homes they could find. There is something strange in the fascination of the people for the places which they are well aware are liable at any time to the lava torrent or the storm of ashes. Eruptions have occurred, and will occur again; but all the reasoning you can offer would not induce these Italian peasants to go and live elsewhere.

At the present time Professor Palmieri reports from his observatory, near the top of the crater, that symptoms have been observed by him which indicate a new eruption, and strange to say, the Italians, who are accustomed to live constantly in danger, quietly look out for the occurrence, living at the very foot of the death-dealing mountain. The soil is extremely fertile, and eagerness for wealth seems here even to expel fear for death.

XIII.

THE CAVERNS OF NAPLES.

EXCAVATIONS NEAR NAPLES. — POZZUOLI. — VISIT TO THE CAVE OF THE CUMEAN SIBYL. — ACCIDENT TO AN ENGLISH TRAVELLER. — HUMAN PACK-HORSES. — DARKNESS AND TORCHES. — THE LAKE OF AVERNUS. — DROWNED IN BOILING WATER. — A DANGEROUS WALK. — IN NERO'S PRISON. — INSTRUMENTS OF TORTURE. — USE OF THE RACK. — THE IRON BEDSTEAD. — BROILING A MAN ALIVE. — TREATMENT OF PRISONERS. — AN ANCIENT FUNERAL. — VIRGIL'S TOMB. — CONSTRUCTING WINE CELLARS. — NOVEL PLAN OF ROBBERY.

THE traveller who visits Naples has abundant opportunities for making underground explorations in the neighborhood of that city. A few of the places he can examine are of natural origin — the Blue Grotto, for example; but by far the greater part of them are artificial. A most interesting journey can be made to Pozzuoli and its immediate neighborhood. With a longing desire to see some of the underground curiosities that have made that part of Italy famous, I arranged a tour in that direction before I had fairly settled myself at the hotel. We made a party of three, all Americans, and all as impatient and uneasy as our race is said to be when travelling on the continent. A skirmish with a horde of rapacious coachmen secured us a carriage, and we drove out of Naples by the road which skirts the bay in the direction of Rome.

Arriving in the vicinity of the famous places, we were beset by guides, who almost climbed into the carriage in their eagerness to secure an engagement. We picked out the cleanest of the lot, or rather the least dirty, and mounted him upon the box by the side of the driver, where he sat in all the dignity of an emperor. He spoke a confused jumble of English, French, and Italian, which was no language in particular, but might be anything in general. His first move-

ment was to stop at a wayside house, from which a woman emerged bringing us half a dozen candles or torches of twisted rags and tallow, each of them as large as one's wrist, and about three feet long. We objected to so many, but the guide assured us they would all be needed. I was inclined to doubt his statement, from my knowledge of the rascality of guides in general; but he met me with the promise, "Me them will pay for if not they be wanted, Si, signor. You verrez will."

Of course we could not refuse after this guarantee. I paid for the torches with a silent resolution to make the fellow eat what were left over; and, as the tallow was bad, and the rags were worse, there was good reason to believe they would not make an agreeable dinner.

Soon after making this purchase, the work of sight-seeing began. Each place we visited had a man at the entrance, and not one of us could go inside without paying for the privilege. There were always a half dozen idle fellows hanging about ready to sell cameos and other curiosities which had been dug up in the vicinity, as they solemnly avowed; in reality the cameos were of modern manufacture, and made in Rome or Naples. The speculators would begin by asking fifty francs for a cameo which was worth about five, and which they would sell for five if they could not get any more. If we safely ran the gantlet through these avaricious tradesmen, we were beset by local guides who wanted to lead us, and we generally found it desirable to employ some of them in order to see what the place contained. In one instance these guides acted as pack-horses, and I can testify that one of them, at least, had all that he wanted to carry; and this is the way it happened.

At the cave of the Cumean Sibyl, where the Emperor Nero and other famous men of the olden time were accustomed to go to hear the prophecies on which their fate depended, we found a larger crowd than usual. A party of Americans were just emerging as we entered, and one of them intimated that the place laid over anything he had yet seen. Our torches

BAY AND MT. VESUVIUS.—SEAPORT OF SOUTH ITALY, NEAR THE SITES OF HERCULANEUM AND POMPEII.

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were lighted, and we went forward quite a distance, through a tunnel eight or ten feet wide, out of which a corridor tunnel descended. Down this tunnel we walked until we came to the edge of a black, repulsive pool, over which the light shone very dimly. There was considerable smoke hanging over the water, and altogether the place was about as gloomy as anything I had ever seen. For all that could be discovered, the pool might be a thousand feet deep, and any number of miles across; to venture upon it might be like venturing upon the Atlantic Ocean, or any other great body of water. I noticed that the guides had their trousers rolled to the knee, and were barefooted. They fearlessly entered the water; two of them carried the torches, and three others hoked themselves to the edge where there was a sort of step-stone.

"What is to be done now?" we asked of our private guide.

"Monez ze backs ze men of," he replied. "You they carry portez will to Grotto del Sibyl."

We hesitated to trust ourselves with these fellows, who might drown us, or throw us into a hole a few thousand feet deep, and leave us to come up again through the crater of Mount Vesuvius. But finally we concluded to try it, and so we mounted our two-legged steeds and rode off.

It happened that I was the heaviest of our party, and it also happened that the man who took me did not weigh as much as I did by at least fifty pounds. He trembled beneath me like a plateful of jelly in the hands of an intoxicated waiter, and I expected every moment he would drop me into the water. We went out from the shore into the smoky darkness, and in less than a minute we were completely at sea. Water was beneath and around us, and there was a black sky above that we could almost touch. No horizon was visible, and altogether we seemed to be in a world about ten feet in diameter, and without sun, moon, or stars.

Our porters splashed along in water about two feet deep, and I thought much more of the liability of my pack animal to stumble than I did of the Cumean Sibyl and her oracles.

Nero was less in my mind than the garlic-eating Italian beneath me, and I was much less interested in the Roman kings than in a certain subject of Victor Emanuel. Our trio exchanged comments on this novel mode of travelling, and for the time we had very little appreciation of the wonderful history of Rome and her dependencies.

As near as my recollection serves, we had about five minutes of this sort of travel, when the head of our procession came to a halt before a recess in the wall, which our leader described as the Sibyl's Bath. It seems that before delivering her oracles, she used to take a bath, on the principle, doubtless, that cleanliness is next to godliness, and the purer her skin the more likely would the gods be to aid her with their inspiration. The artists represent her as a pretty woman, and of course she was well aware that frequent bathing had a tendency to preserve her good looks.

The couch or bench where she reclined when delivering her oracles was pointed out, and as it then appeared, it was anything but comfortable. The presence of the water in the cave was explained to be something modern, and not at all in fashion when the Sibyl used to be at home to visitors of wealth and distinction. She used to keep her floor dry and well swept, and probably she had a little sideboard with a cold ham or two and a bottle of wine. Nero was a frequent caller, both in fashionable and unfashionable hours, and used to send her valuable presents. Mrs. Nero was jealous, but the old gentleman was in a position to do pretty much as he liked, and didn't mind her scolding. One of my companions showed me a scrap of paper, which he said he found just inside the entrance to the cave, while I was paying off the guides. It ran as follows: —

May 10, 4 P. M.

DEAREST SIB: Expect me at eight. The old lady is going out this evening, and won't miss me. Have the tea ready, and send out for a bottle of Cliquot. I will bring a mince pie and some Limburger cheese; also a new pair of ear-rings and a chignon.

Your loving NERO.

I suspected that the note was a forgery, as it was written in English, and the paper had the water-mark of 1860. I called my friend's attention to these slight discrepancies, and he at once put the paper in his pocket, and said nothing more about it.

After looking at the couch of the Sibyl we started back to our landing-place. Just as we neared it we met another party going in. One of the porters of the new party was evidently weak in the knees, for he stumbled just as he passed me, and went down like a handful of mud. The gentleman he carried was dropped into the water, and fell flat, as though intending to take a swim. He slowly rose to his feet, and after blowing the water from his mouth with a noise like the spouting of a whale, he ventured several remarks that were nowise complimentary to his porter or to the place. He appeared somewhat excited. His language showed him to be English, but there was nothing in it to indicate that he was a member in good and regular standing of the Church of England. He did not finish his journey to the bath and couch of the Sibyl, but followed us to the shore, where he wrung himself out, and then retired to his carriage to be hung up to dry. With a heartlessness peculiar to many travellers, he refused to pay the porter for his services. It is fortunate that the latter did not understand English, as he would have been offended at the remarks which were made about him.

From the Sibyl's Cave we went to the famous Lake of Avernus, which was described by Virgil long before anybody who reads this book was familiar with a single word of Latin. Near the lake is the famous passage into the mountain about which Virgil wrote: —

"Facilis descensus Averni. Sed revocare gradum, hic opus, hic labor est."

We paid our admission fee, and then prepared according to the directions of the guide. We laid aside our coats and vests, removed our collars, neck-ties, and hats, and altogether put ourselves in a condition quite improper in polite society. A boy stood ready to precede us in a costume consisting of a pair

of pantaloons and a tin pail. A fresh egg was now shown us, and we examined it to see that it was quite cold and raw. The boy then took the egg and a torch, and went into a tunnel like the one at the Sibyl's Cave. A blast of hot air met us at the entrance, as though it came from a furnace, and I thought of Nebuchadnezzar and the treat that he used to have for his visitors. On and on we went, and also down and down. Old Virgil was right when he said that the descent was easy, for we went down with the grace of so many oysters entering the mouth of a champagne bottle. Hotter and hotter grew the air, and before we were half way down I remembered some business that I had neglected when I left America. I wanted to go back to look after it, but my friends argued that it would keep a little longer, and I had better go on. So we continued down into the bowels of the mountain, over a slippery pathway and in a temperature as agreeable as that of the stoker's room on a steamship.

We reached the end at last, and the boy stooped to the edge of a pool of water and placed the egg within it. We could see a thin vapor rising from the surface, and readily imagined that it was steam. The boy was careful of his hands, more careful than was necessary, since he might have added to the interest of the occasion by scalding them, and then hiring another boy to take his place. There were plenty of boys outside who could be hired cheap, and if a dozen were killed daily by scalding, or rendered helpless, it would have made no serious diminution of the Italian population.

We stood there a couple of minutes, and then the boy took the tin pail and scooped up the egg and a quart or two of water. He then started back, and scrambled quite nimbly up the steep and slippery path. It was a difficult ascent to make, and we acknowledged that Virgil's head was level when he told about the labor required to retrace one's steps from Avernus. We perspired like a man who has just learned that he is the father of triplets, and by the time we completed the journey, our clothing was pretty thoroughly saturated. The boy was accustomed to it, as the old lady's eels were to being skinned,

and the hide on his shirtless back looked like the outside of a long-used pocket-book. The egg was thoroughly cooked, and the water in the pail was of a scalding temperature, altogether too hot to put one's hand into. The egg cost us half a franc, and so did the boy: one of us ate the egg with a little salt, but we declined to eat the boy with or without salt, and he did not urge us.

The guide told us that one day an Englishman went down the "descensus Averni," and on arriving at the hot water, he stepped around so carelessly that he slipped and fell in. His cries and shrieks rang through the tunnel; he was pulled out as quickly as possible, but he was so badly scalded that he died in a few hours. Several accidents have happened there by persons scalding their hands and feet, but the character of the place is such, that people are likely to be careful; otherwise there would be frequent casualties to record.

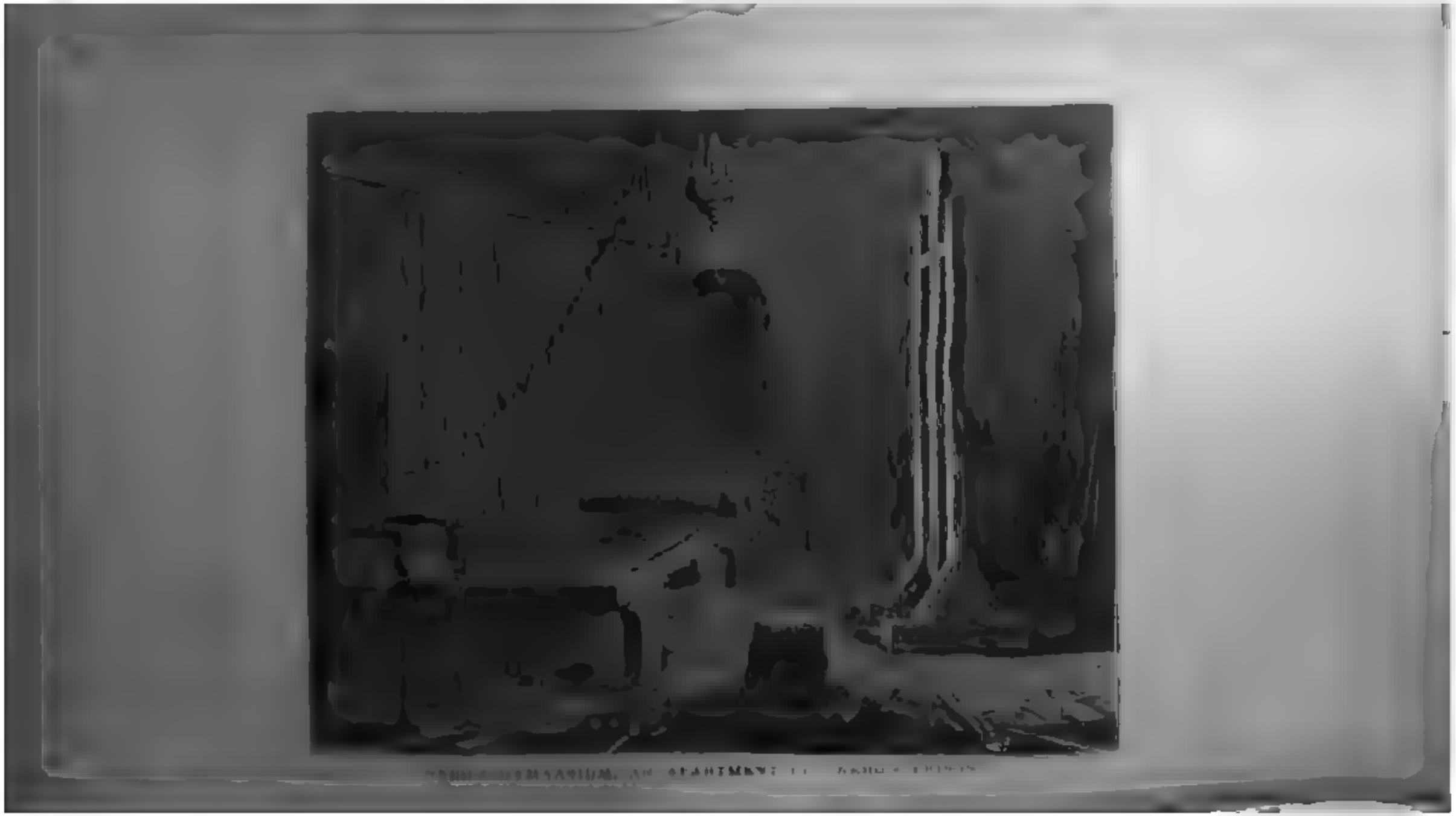
We visited the ruins of temples that were erected to I don't know how many deities, and the next subterranean exploration that we made was at Nero's Prison, as the guide and the guide-books call it. We left our carriage and went on foot up a narrow lane, and along a path where beggars followed and beset us at every turn; notwithstanding their importunity, they did not extract any money from us, though they appeared in all the conditions in which beggars could possibly present themselves. Nero must have been a charming personage if one could judge of him by looking at the place where he used to shut up those who offended him. It was a subterranean affair, and we were obliged to light our torches to explore it. We were led through winding passages into cells that were anything but comfortable, the guide stopping every moment to explain to us the nature of each one of the cells, and the uses to which they were put. They were small enough to render it utterly improbable that a man would exert his legs very actively in running, after he was once shut in, and as for light and ventilation, they were quite in keeping with the size of the apartments.

I inquired about the character of the food which Nero used

to furnish to the occupants of his boarding-house, and was told that it was not of a luxurious character. Nero had no *table d'hote*, but used to send the meals to the rooms of his guests. None of them are alive now, and their early death is to be attributed in many cases to the treatment they received. At the time they resided there, oysters had not been invented, and there is nothing on record to show that the delicious conglomerate which we call hash had made its appearance. Some of the patrons used to express a desire to live on the European plan, and take their meals outside; but the proprietor would never permit it. And it must be said, to his credit, that his establishment was to a certain extent a free lunch concern, as he never charged anything for board and lodging. Everything was gratis, and of course the patrons who complained must have been mean fellows, who couldn't be satisfied, no matter what you might do for them.

The furniture of the place was very simple. It had been mostly removed when we were there, but it consisted originally of a bundle of straw on the ground and a double lock on the door. There used to be a gymnasium, where they kept a choice lot of racks, thumb-screws, and other luxurious arrangements. Life in the private rooms used to be monotonous, and in order to render it interesting, Nero would take his patrons into the gymnasium to amuse them. Some of them he would play a joke upon by tying them down on a rack and then winding up the machine so that a man of five feet eight would often be converted into six feet two. When he had been played with in this way, they would turn him loose, though releasing him did no good, as he was generally dead before they let him off.

The gymnasium had another arrangement, patented by Mr. Procrustes, which was intended to equalize all men, and make them of a uniform height. This invention, based on the principles of mechanical communism, was a bedstead of iron, and there were various individuals who enjoyed the treat of being placed upon it. A poet has alluded to it as follows: —



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"This iron bedstead they do fetch
To try our hopes upon
If we're too short we must be stretched,
Cut off if we're too long."

When they laid out a man on this couch, if its length corresponded with his, he was immediately removed before he had time to go to sleep. If he was short, both in money and in stature, they elongated him until he could touch headboard and footboard at the same time: and if he was a tall fellow, they shortened him at the feet with a large pair of shears that were kept for the purpose. When a hundred men had been measured in this bed and placed in a row, they were found to be of the same elevation. A good many of them died soon afterwards, but people were numerous in those days, and the dead ones were not missed by those who didn't know anything about them.

Down in the kitchen, Nero had a gridiron resembling a garden gate, or a section of an iron fence. He had so many cooks that all of them could not be constantly employed, and so he busied himself to devise ways to employ them. He found that the gridiron was just the thing, and when his cooks were idle he used to take one of his lodgers down stairs and promise him a good roast. The lodger would be thinking of a nice turkey or a leg of mutton when Nero said "roast" to him, and as the private table was not very good, he was always ready to go below. When they got down stairs Nero would trip the wink to the cooks, who would seize the lodger and tie him on the gridiron. They then built a fire under him, and Nero carried on the joke by standing alongside with a big ladle and pouring hot oil over his guest. When he was done brown, and turned over and done on the other side, they would let him off to enjoy the fun of seeing the sell played on the next man. No doubt he would have enjoyed it had he not been dead long before they got through with him.

When we returned to Naples, we went by another route than the one we had taken in the morning. At one place our way led through a tunnel cut into the solid earth, and said to

be more than two thousand years old. It has worn down greatly since it was first opened; the marks of the axles of carts and wagons are visible along its sides ten or twelve feet above the present floor. It is lighted by torches placed at regular intervals along the walls, and is an important thoroughfare for people going between Naples and certain villages and towns to the north of it. At the end nearest to Naples we were taken to what is supposed to be the Tomb of Virgil, though its authenticity is considerably in doubt. It certainly is not much of a tomb, and many a man not half so talented or famous as Virgil has been lodged after death in far more beauful quarters than these.

The peculiar nature of the earth composing the hills arounnd Naples has greatly facilitated the construction of tunnels and caves. It is almost identical with that of the bluffs of Vicksburg — easy to cut, and at the same time sufficiently firm to prevent falling in. No roofing or arching of any kind is needed, and the tools ordinarily used in excavations are all that are required. Consequently every man who has a hill on his farm can construct a spacious wine cellar at little expense; and if he has a friendly neighbor over the hill, they can easily cut their way through, and save the trouble of climbing when they want to visit each other.

I heard of Neapolitan thieves who sometimes find out a well-stored wine cellar in the side of a small hill, and carefully observe its position. Then they erect a small house on the other side, and begin a small tunnel. They cart the dirt away at night, and after a month or so enter the cellar and steal enough wine to pay them handsomely for their trouble.

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DR. AND MRS. SCHLIEMANN, THE EXCAVATORS, AT MYCENAE (GREECE).

XIV.

THE EXCAVATIONS OF DR. SCHLIEMANN, AT MYCENÆ (GREECE).

HIS EARLY LIFE AND IDEAL—THE TREASURES OF PRIAMUS—DESCRIPTION OF THE SPOT—EARLY HISTORY OF MYCENÆ—PAUSANIAS, THE ANCIENT ARCHÆOLOGIST—WHERE THE EXCAVATIONS WERE COMMENCED—THE TOMB OF AGAMEMNON AND HIS FAITHFUL WARRIORS—DESCRIPTION OF THE THESAURUS FOUND—PROOFS OF THE IMMENSE ANTIQUITY OF THE TOMBS—ANCIENT PORTRAITS TAKEN OF HEROES OF ANCIENT GREECE—HOW IT WAS DONE—THE VALUE OF THE DISCOVERIES REGARDING ART MATTERS—HERACLES STRUGGLING WITH THE LION—DR. SCHLIEMANN'S HEROIC WIFE—DISCOVERY OF THE TEMPLE OF ÆSCULAPIUS—A BYZANTINE CAVE UNDER THE ROCK—A DISCOVERY WHICH FILLS ATHENS WITH JOY—THE STATUE OF VICTORY FOUND IN ALMOST PERFECT CONDITION.

Dr. Heinrich Schliemann, the great excavator, of whom so much has been said of late, is a German by birth, and a man of an idealistic character. In his youth, he dreamed of the heroes of antiquity; he was a passionate student of the Trojan war, and the adventures of Odessus and Agamemnon. He loved to hear, in school, Homer recited, and afterwards, when he went through his variegated life, as ship's boy, ship's broker, clerk, commercial correspondent, and, at last, as an independent and rich merchant, one ideal pursued him, that of seeing, for himself, the seat of Homer, and the fatherland of the heroes of whom that great poet of antiquity sings; he wanted to find the traces of the past dead. After he had occupied himself, for many years, with his plan, after having surmounted innumerable obstacles, of which he gives a touching description in his autobiography, he succeeded, in 1867, in undertaking his first trip to Ithaca, the Peloponnesus, and Troja. The searches then made led to the discovery of the treasures of Priamus, which astounded the world; and scarcely has the astonishment of such remarkable

discoveries cooled off, when Dr. Schliemann surprises us by a new miracle. He believed in the divinity, and found its trace; the treasures showed that Priamus had existed; the tomb identified Agamemnon.

But before entering upon a description of the excavations, and the treasures found therein, we deem it highly necessary to give a description, in outline, of the spot where the gems of antiquity are being unearthed.

We cannot do better than give the extract from the notes of an excursion, made on the very spot, under which Dr. Schliemann is now digging for treasures and historical facts, which undoubtedly are of the greatest importance for the knowledge of antiquity and the land of Homer. This excursion was made in 1871, some five years before the persistent doctor commenced his researches.

It reads substantially as follows:

"From Tiryns we proceeded, Feb. 7th, by carriage to Argos, the city of Inachus, where we found horses saddled, waiting for us, to enable us to go to Mycenæ. We crossed, on our way, the river Inachus, and found, on the Argolic plain, for the first time, the red poppies which we afterwards noticed as so abundant in Palestine. After having gone up the crumbling steps of the amphitheater, the most important monument at Argos, (where, beset by the importunate solicitations of some boys, we bought two or three old coins, where *coin is said to have been first invented.* The invention of coin is ascribed to the Lydians, yet it is certain that it was used at Argos.) We mounted our horses and rode over the plain, finding in many places only a difficult bridle-path, to the treasury of Atreus, or the tomb of Agamemnon. This structure, for it may be either treasury or tomb, or both, (we commend to Dr. Schliemann the solution of the problem,) consists of a building cut out of the side of a hill, entrance to which is through a gateway, down an inclined plane, with walls on both sides, into two vaulted apartments—one larger than the other, and both now empty. The most remarkable feature is the gateway, and especially the huge soffit which spans it, not

more from its immense size, than from the apparent impossibility of removing it from the place which it occupies, held in its position by its own weight, and supporting the pressure of the mass above it. (A similar contrivance we noticed in the gate-way of the temple of Jupiter at Baalbek.) 'The remains of copper nails in the walls of the larger apartment, indicated that it had been sheathed with copper plates, while the inner chamber may have been coated with marble.'

Here, after having examined the ruin, we lunched and again mounting our horses, proceeded to view the celebrated 'Lions' of Mycenæ, once the site of the royal palace of Agamemnon—itself a *ruin in the time of Homer*—its foundation going back to an almost date less antiquity. The ruins of Mycenæ are, in many respects, unequaled in interest by any object in Greece. Their position is fortunate; there is no habitation near them. The traveler ascends from the open plain to the deserted hill on which they stand. The walls of the citadel may still be traced in their entire circuit, and on the western side they rise to a considerable height. Only a few foundations of ancient buildings remain, and one or two cisterns hewn in the rocky soil, and lined with cement. Such is the present state of the Acropolis of Mycenæ. Two gates, one on the northeast, the other on the northwest, both guarded by a tower, gave entrance into the city. The two gates and tower seem to have been connected, and illustrate the military architecture presented to our notice in the Iliad. The 'Lions' are represented in high relief, rampant, headless, their feet resting on a pedestal which is a Doric column reversed, carved out of a block of gray limestone. By whom erected, or for what purpose, must ever remain a mystery. Perhaps the simplest explanation is the best, that they denote the 'courage leonine,' and were heraldic badges upon the national escutcheon of Mycenæ. We clambered over the walls of the ruined palace of Agamemnon, on the hill-side we came across several pieces of antique pottery, which we have preserved. To make the illusion more complete, while we were exploring the ruins, a fierce, wolfish, shepherd-dog, the only guardian of the place, in a field below,

kept up a loud, persistent barking, which ceased not till we had left the spot.'

It is perhaps too soon, in the present imperfect state of the excavations at Mycenæ, to form a true estimate of their value, as related to the authenticity of the heroes of Homer. However, we will give, as far as that is possible, from the reports of Dr. Schliemann himself, a review of the wonderful things which this great sapper and miner has brought to light:

The city of Mycenæ must have been wonderfully beautiful. Homer calls it "the city rich in gold and broad of streets," at the time when the ruler of Mycenæ, Agamemnon, assisted the Greeks against Troja, with one hundred ships, and a great number of men, for which service he was elected their commander-in-chief. He fell, at his return, by the faithlessness of his wife, and with him the glory of the city was gone. Only rarely we find, in history, traces of her unimportant existence. About the middle of the fifth century B. C., she was destroyed by the Argivi, and her inhabitants dispersed.

The ruins were never taken away, and they were only for archæologists of antiquity and of the modern times, an object of interest.

The "gate of lions" of Mycenæ, which has been built in over-old Grecian style, has been known long ago; it gave entrance to the bourg; Pausanias, who, while traveling in Greece, two centuries after Christ, visited the old city of Atreus, probably found the gate in a far better condition than it is at the present date; it was, for him, an object of the highest interest, and he was of opinion that the Cyclops themselves had builded the gate and walls. Further, he relates: "Under the ruins of Mycenæ, is a well, and the under-earthly apartments of Atreus and his descendants, which served them as treasuries. There are also tombs; in the first place, that of Atreus, and then all the graves of those who returned with Agamemnon from Troja, and who, like he, were murdered by Aegisthus. Only Clytemnestra and Aegisthus have not been deemed worthy of being buried there; their graves are outside of the wall."

Dr. Schliemann, reading this account of the archæologist of antiquity, had not the slightest doubt but that the history of Greece was more than a mere tradition, and how wonderfully have his presentiments been fulfilled!

When we enter the bourg by means of the "gate of lions," we are soon enabled to continue on our way through a corridor, which is formed by a well-preserved stone wall which surrounds a circular plain of about fifty feet in diameter the wall reaches nearly to the height of a person's breast On this plain, Dr Schliemann commenced his excavations; already at a small depth they found the first traces; several slabs of a yellowish lime, adorned with ancient reliefs, and showing that they once had served as slabs on graves. On taking them away, they saw a broad shaft in the earth, twenty feet long, and ten feet deep; a second, parallel to the first, followed, and afterwards, three others were found behind the smaller sides of the first two. Of course, Dr. Schliemann was bound to penetrate to the extreme depth of these shafts, and while digging, he found earthenware, and small objects manufactured of gold.

At last, they came to the extreme depth on a hard floor, and here three skeletons were lying, at a little distance from each other, surrounded by innumerable weapons and objects of luxury, partly of gold, and partly of silver; one of these corpses was distinguished by exceedingly well-preserved teeth.

This was the tomb of Agamemnon and his faithful warriors.

Dr. Schliemann, in his correspondence to the London *Times*, describes the treasures which he found lying around the bodies, in the following manner:

"Among the most interesting objects of this sepulchre I reckon the magnificently ornamented golden buttons. Twelve are in form of a cross, and one of them is two and one-fifth inches large, and three inches long; three are somewhat smaller, and the remaining eight are of a still less size. Of splendidly ornamented round gold buttons were found, in all, two hundred and sixteen, two of which are two inches in diameter, seven are of the size of a five franc piece, and two

hundred and seven are still smaller. All these buttons, the lower part of which consists of a bone button in form of our shirt buttons, must have served on the clothes of the deceased, whereas all which show only a flat piece of bone or wood, have evidently served to decorate the sheaths of swords, lances, etc., to which they had been soldered with tin, or otherwise fastened. There were in all found in the tomb, twenty-five two-edged bronze swords, sixteen of which are in a perfect state of conservation; four of them had handles plated with gold and richly ornamented. There were also found with the swords, five large handle-buttons, four of which are of alabaster, and one of wood; all of them are ornamented with golden nails. Further, two golden shoulder belts, which were worn on the shoulder across the breast; both are four feet long, and one and three-fifths inches broad. There were further found two large girdle-belts ornamented with circles and flowers; one of them is composed of two pieces. There was also found a part of a similar belt, and a child's golden girdle-belt, only one foot four inches long, and two and one-fifth inches broad. Further, a splendidly ornamented golden handle, probably of a scepter. It terminates in a dragon's head, whose scales seem to have been imitated by square pieces of rock crystal, which are inlaid like mosaic. This is an object of marvelous beauty, of which Homer would have said, 'A wonder to look upon.' There were also found seven large and one small golden diadems—one of the former is ornamented with golden leaves. All of them show splendid ornaments of circles and spiral lines. Further, four golden ornaments of the greaves, almost in form of a bracelet: one comb of bone, in a large handle, or casing of gold, of the usual form, as ladies wear it; one enormous, most magnificently-ornamented, massive, gold bracelet, weighing three hundred and sixty grammes. In the center of the ornamentation of this bracelet is soldered a separate piece of gold, representing the sun with his rays. The size of this bracelet is so enormous that the person who has worn it must have had gigantic arms. Quite in opposition to the size of the bracelet are two massive golden seal

rings, the opening of which is so small that they would only fit a child of ten years. I, therefore, suppose that they may have been used as seals only. One of the seals represents two warriors on a two-wheeled chariot with two horses, which seem to run at full gallop: one of the warriors is holding a bow in his hand, and has just shot an arrow at a stag. The stag is wounded, and in anguish turns his head. The other seal ring represents a warrior who has just vanquished his three enemies, and is in the act of giving, with his uplifted sword, a last blow to one of them, wounded, and kneeling before him on one knee; the latter tries to parry the blow with his uplifted hands and with a lance, which he holds in his right, and seems to throw at his opponent. Another seems to be mortally wounded, for he lies on the ground, leaning on both his hands. The third, who alone of all the four warriors has a helmet with a crest on his head, is flying under the cover of an enormous shield which reaches from his neck to his heels; but still he turns his head towards his victorious enemy, and is in the act of throwing a lance at him. The anatomy of all the men is so well observed, their posture is so faithful to nature, and everything is executed with so much art, that when I brought to light these rings, I involuntarily exclaimed: 'The author of the 'Iliad' and the 'Odyssey' can only have been born and educated in a civilization which could produce such wonders. Only a poet who had master-pieces of art like these continually before his eyes could compose those divine poems.'

"At the head of one of the bodies was found a large and heavy golden helmet, but it had been much crushed, and had become nearly flat under the ponderous weight which pressed upon it. In its present state, it is difficult to describe it. On its forepart, the openings for the eyes and mouth, as also a protuberance ornamented with small stars, are distinctly visible, as also on the top of the helmet, the tube for the crest. The back part is beautifully ornamented with an imitation of the hair. The face of the same body was covered with one of the golden masks which we frequently met with. It seems to

have been the custom with the ancient Greeks, to cover the faces of their beloved dead, with masks of gold which exactly represent the outline of the features; probably they did so to preserve the face. We find this custom back in the wooden masks of the Egyptian mummies. The breast and sides were covered by a one-foot eight-inch long, and one-foot broad, thick plate of gold, which was no doubt intended to represent the coat of mail. There were further found one hundred leaves of gold, either of circular or of cross-like form, with impressed ornamentation, consisting either of spiral lines, or of circles. Further, three very heavy golden breast-pins, of which the one is five and one-half, the other five, and the third four and one-half inches long. The last is crowned with a ram, the two others with an ornament in shape of a helmet, and the heads of all the three breast-pins are perforated, probably to put in a flower. There were further found two masterly ornamental objects of massive gold in the form of crosses; also a large golden vase weighing one and seven-eighths kilogrammes: it has two handles, a large foot, and ornamented with three upper and two lower parallel lines, between which is a row of fourteen stars; further, a large golden vase with one handle, and an ornamentation representing seven beautiful flowers; another golden vase with two handles; further, a splendid little golden *œnoehœ*, or wine can, with an ornamentation of spiral lines. Further, six golden drinking cups, one of which is a drinking cup with two handles, on each of which is a pigeon, each of the two handles being joined to the foot by two separate golden blades. This goblet reminds us of Nestor's goblet, which was also ornamented with pigeons (see 'Iliad,' XI, 632, 635). One of the other goblets is ornamented with parallel flutings. There were further found two small golden vessels; also, eight silver vases, three of which are admirably conserved; one of the other has its bottom and the mouth of bronze; below its bottom were found one hundred of the aforesaid golden buttons. I further found, in this tomb, thirteen large bronze vessels. This kind of vessel was in high esteem in the heroic age, and we see them continually men-

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tioned by Homer as prizes in the games. I suppose that to each hero were given in the grave the goblets and other objects which were dear to him in his life-time, having been won by him in the games, or having been given to him by his host as a pledge of hospitality and friendship. There was also found a large quantity of small perforated amber balls of no glance, and a bronze or copper fork with three teeth, which had probably served on the funeral pyres. There were further found thirty-five arrow heads of obsidian. Nothing could give a better idea of the great antiquity of these tombs than these stone arrow-heads, for the 'Iliad' seems to know only arrow-heads of bronze (*e. g.*, 'Iliad,' XIII, 650 and 662). Probably there had also been deposited bows and quivers in the tomb, but they would have been of wood, and would have rotted away. To my greatest regret, among thousands of gold ornaments, there is not even a single sign resembling writing, and it therefore appears certain that the sepulchres belong to an epoch which preceded the introduction of the Phœnician alphabet. Had the latter been known, the Mycenæan goldsmiths, whose continual efforts appear to have been directed to the invention of a new ornamentation, would have been very ambitious to show the novelty of the alphabet. A second proof of the immense antiquity of these tombs, is the entire absence of any vestige of either iron or glass, or of any pottery made on the potter's wheel. But the hand-made pottery had reached a high degree of perfection, such as has never been attained here in later times by the pottery made on the wheel."

The doctor, enthusiastic as he is with his new discoveries, had the mortal remains of the immortal heroes taken from their graves, and the great departed ones received the unprecedented honor to have their portraits painted by an artist of our day. Of course, the golden mask was used for that purpose.

The greatest scientific importance of the discoveries at Mycenæ, lies in the fact that we now make acquaintance with a kind of art which very nearly approaches oriental repre-

sentation and oriental technique. It can easily be seen, from the works of art found by the excavations, that the artists of that remote time did not care so much to give true representations of real existing things, but to procure to dead things, as much as possible, a living, graceful form.

Among the treasures, a golden plate was found, upon which Heracles is engraved, struggling with a lion. This last engraving, above all others, may serve as a scientific guide, through the labyrinth of the treasures of Mycenæ. The struggles of Heracles with the monsters of the earth, are the property of Grecian tradition; hence, we have not to deal with Asiatic or India-European art, but with real, purely Grecian art.

The most precious objects found at Mycenæ, are collected at Athens, with those formerly found by the doctor among the treasures of Priamus, and are preserved in the vaults of an Ionian bank.

It is proper that we should allude to Dr. Schliemann's heroic wife, of whom, as his most valuable and sympathetic assistant in his labors, he speaks, as is most fitting, in words which constitute her highest eulogy. The story of their union reads like a romance. "Mrs. Schliemann is the only woman in Greece who knows the Odyssey by heart. The Dr. once said, before a party of Athenians, that he would marry the first lady who could recite the Odyssey. A fair Greek girl appeared one day, unintroduced, and asking if the promise was genuine, recited Homer, and secured her home. She also secured a wife's share of $1,000,000. The two have been faithfully burrowing among its ruins themselves, and as will be seen from the portrait, she is proud of the accomplishments of her husband, and wears one of the trophies of his glory, the head apparel of queen Helena, whose elopement with Paris, the son of Priamus, caused the Trojan war.

It is known that the archæological society of Athens, under whose direction Dr. Schliemann is now excavating at Mycenæ, and from whom he has met with no little opposition, besides the difficulties arising from the nature of the ground, which

would seem, to a less resolute spirit, almost insurmountable, have of late made some valuable discoveries at Athens. They have cleared away the debris on the south side of the Acropolis, and have discovered the temple of Æsculapius, where they have found many bas-reliefs representing the goddess of health, and two very beautiful marble heads, nearly perfect; also, some inscriptions of great historical value. They have also found a Byzantine cave under the rock. This circumstance reminds me of some exquisite specimens of sculpture seen by me, while in Athens, in my visit to the Acropolis. From these we return to the recent excavations at Olympia. These are carried on by a commission from the German and Greek governments. The latest discoveries announced are those made on the site of the celebrated temple of Jupiter, consisting, among others, of a Doric capital, with its abacus in excellent preservation, considered as belonging to one of the columns supporting the eastern pediment of the temple, fragments of bronze, and terra-cotta objects, also, of the marble tiles described by Pausanias as composing the roof; and a magnificent torso, supposed to be the statue of Jupiter, one of the group of figures adorning the pediment of the temple. On the last day of the year, however, a telegram was received by the king from Dr. Demetriades, announcing a discovery which has filled Athens with joy. The statue of Nikê (Victory), one of the group in the pediment, has been found imbedded in the soft, alluvial soil, in an almost perfect condition—as if it had only yesterday been taken down from its lofty pedestal. It is said to be a figure of unmatched beauty and grandeur, and what gives it a higher value is that the name of Praxitiles himself is engraved on it. Thus much is as yet known, but details are eagerly waited. Archæological discovery is eagerly pursued in every part of the land, of which it may be said that not a spadeful can be turned, without revealing some new treasure of its most glorious epoch.

The objects found by Dr. Schliemann have been forwarded to England, and placed in charge of the National Bank. They have been placed under the care of that institution for

safety, and will remain there in the strong room, until a suitable museum can be provided, when they will all be labeled, and will be exposed, in proper cases, for the public to see them.

It is a fact not generally known, that Dr. Schliemann is not assisted by any fellow-enthusiast in the cause of archæology, nor is he in the employ of any society. He defrays the expenses all himself, and we may be assured that they are very heavy.

It is but proper that we should allude here to the fact that Mrs. Schliemann is most ably and energetically assisting her husband in the discovery of the treasures of the ancients.

The dome of the Second Treasury was broken in, a long time ago, and therefore it is better known to antiquarians; but Mrs. Schliemann has now thoroughly excavated, and explored the whole building. While her husband was excavating within the walls of the Acropolis, she undertook the excavation of this relic of the past, and the approach to it, which was formerly completely concealed, is now laid bare. Its position is close to the Gate of Lions, and it is found to differ only in slight details from the other one, known as the Treasury of Athens. The lintel over the doorway is the largest stone in the building. It is twenty feet long, seven feet wide, and eighteen inches deep, and a course of large stones of the same depth is carried all around the walls, on the same level. The diameter of the dome is a little less than that of the Treasury of Athens, but as there is an opening in the top, by which the light enters, the view is not so impressive. The inhabitants of Mycenæ did not seem to be acquainted with the principle of the arch, as the dome is constructed with courses placed horizontally. Dr. Schliemann, pretending that Agamemnon was buried here, calls it the Tomb of Agamemnon; others have named it the Tomb of Cassandra.

The Treasury of Athens shows the most perfect condition of building of the ancients. The second, third, and fourth treasuries (there are four in all), gradually decrease in architectural skill, and we might almost say of the fourth, that it

is nothing but an excavation made in the soil, speedily covered with rough stones. It is covered in such a way that a person entering it has to creep on all fours.

For what purpose these buildings were created, remains a mystery. In the Homeric age, tombs are always described as "piled," or "heaped up;" they are always mounds, and the fact of the earth covering these so-called "treasuries," is a strong evidence of their sepulchral character; but the magnificently built accessories would lead to the conclusion that it belongs to a period posterior to the Iliad and the Odyssey.

Hector's tomb is described as the "hollow grave." This was the primitive cell, which became developed into an arched dome. Of this, many examples are found in the tumuli near Kertch, some of them of a very large size, and, though different in construction, they afford a good illustrative parallel. In the structures just described, we find a developed architecture which seems to have been rich with metallic decoration. Here all resemblance to the simple cell of the hollow grave has been lost, and now the foot or two feet of earth, heaped on the top, is nearly all that is left to remind us of the original mound, from which this style of tomb had its origin.

XV.

MEXICO AND ITS MINES.

THE USES OF SILVER—COIN AND ITS ABUNDANCE—PUZZLES OF POLITICAL ECONOMISTS—WONDERFUL SKILL OF THE SILVER-WORKERS—THE SILVER PRODUCT—THE MINES OF MEXICO—THEIR EXTENT AND RICHNESS—GUANAJUATO AND ITS MINES—THE *VETA MADRE*—VISIT TO THE SERRANO MINE—UNDERGROUND PYROTECHNICS—THE *VETA GRANDE*—THE PACHUCA MINE—AN OFFER TO THE KING—THE GROUND PAVED WITH SILVER—SULPHUR MINERS—ASCENT OF A MEXICAN MOUNTAIN.

One of the most important of the metals is the one known as silver. All the civilized nations use it for the manufacture of coin as a circulating medium, and the consumption of the metal for this purpose alone is very great. Political economists have busied themselves with the problem of the immense annual waste from the wearing away of gold and silver, but thus far they have met with no success. For large amounts, bank notes—either of the government or otherwise—are in use, and have many advantages over coin. But for small amounts, gold and silver have not been replaced, and there is little probability that they will be. Their jingling makes an agreeable sound, but unfortunately it reduces the weight of the coin, and wears away, particle after particle, which cannot be saved by any process yet invented.

Silver has long been used in the Arts, and its whiteness renders it particularly desirable for this purpose. Of late years, it has taken a very prominent place, especially in America, and the productions of the silver-workers border on the marvelous. At the Philadelphia Exhibition, the display of silver ware in the American section was such as to attract large crowds at all hours when the place was open to the public, and there were few visitors who did not confess themselves

astonished at what they beheld. There was an endless variety of silver work, from very small articles up to very large ones. Down to a few years ago, the English and other people over the Atlantic had almost a monopoly of silver work, and were justly entitled to a claim for superiority. But at present, the American workmen are equal to any competition, and some of the ornamental pieces they have recently turned out cannot be surpassed anywhere else in the world.

The impetus given to this branch of Art is due, to some extent, to the abundance of silver in the Rocky Mountains and the Sierra Nevadas, and the desire to make as much use of it as possible. Some have feared that the opening of so many silver mines would cheapen the metal, and cause a great shrinkage in the value of that now on hand, but up to the present, no such result has been reached. Silver has taken the place of gold, for many uses, and if matters go on in the future, as they have gone in the past, the demand will long continue to equal the supply.

One of the foremost silver-producing countries in the world is Mexico, and its fame extends a long distance into the past. The metal was known to the ancient Aztecs, and was worked by them, with exquisite skill, into numerous ornamental and useful articles, but among the vast mineral treasures of Montezuma, the quantity of silver was small compared with that of gold, and gave little promise of the argentiferous mines of his territories.

The Spaniards had a keen eye for valuable things, and no sooner did they find what the country contained in mineral wealth, than they proceeded at once to develop it.

They opened mines wherever there were indications of silver, and so fast did they progress that it was estimated, at the beginning of this century, that operations were going on in from four thousand to five thousand localities, which might all be included in about three thousand distinct mines. These were scattered along the range of the Cordilleras in eight groups, the principal of which, known as the central group, contains the famous mining districts of Guanajuato, Catoree,

Zacatecas, and Sombrerete, and furnished more than half of all the silver produced in Mexico.

The great vein, or *Veta Madre*, is referred to elsewhere, and is one of the most remarkable deposits anywhere known. It is contained chiefly in clay slate, and crosses the southern slope of the hills in a northwest and southeast direction, dipping with the slates (the range which it follows) from forty-five to forty eight degrees toward the southwest. The width averages a hundred and fifty feet, and the depth is unknown. It has been traced about twelve miles, but its most productive portion thus far, or rather, the portion operated, is only about a tenth of that distance.

The mines of Zacatecas, opened in 1548, are also upon a single vein, called the Veta Grande, averaging in thickness about thirty feet. The formation is of green stone and clay slate, the former the most productive. The veins of Catoree are in limestone, supposed to be of carboniferous age.

The greatest proportion of silver in every mining district of Mexico is obtained from the sulphuret of silver, an ore of gray color, disseminated through the quartz matrix in minute particles, and more or less combined with other metals. The other varieties of argentiferous ores are numerous, but comparatively small in quantity; they are the chloride of silver, ruby silver, native silver, argentiferous pyrites, and argentiferous galena.

The comparative quantities of these, at the different mines, is very variable, and few of the miners are able to determine them with exactness. Notwithstanding the antiquity of the silver mining business in Mexico, the processes which are employed are still far from perfect, and greatly behind those of the Nevada and other mines. The ore in Mexico is so rich that it has not been considered worth while to practice any economy or to bring science to the miner's aid.

Col. Albert S. Evans, who made a journey through Mexico, a few years ago, gives a graphic account of a visit to the Serrano mine, in the vicinity of Guanajuato. He was invited, with several others, to a pyrotechnic display in the mine, and thus describes it:

"The mine is situated in the hill below the Buffa, at the upper end of the city. Five hundred men, women, and children are employed at this mine, getting out the ore, breaking it up, and sorting it. The men generally work in small gangs, for a share of the sales of the ore they take out. The amount of silver mined, weekly, is about five thousand dollars, and the expenses one thousand dollars, leaving a net profit of four thousand dollars. The great tiro is about nine hundred and fifty feet in depth.

A horizontal tunnel penetrates the hill from a level with the hacienda, cutting the tiro, or perpendicular shaft, at four hundred feet from the surface. This tunnel may be about fifteen hundred feet in length; a railroad track runs through it, and lying down in the cars, we were carried in to the edge of the tiro.

This tiro is thirty feet in diameter, and six sided, laid up in cement, like that at the Valenciano.

The necessity for this is seen in the fact that a rock, weighing many tons, was displaced from a station near the bottom of the shaft, a few days previous to our visit, and falling upon the miners beneath, killed and maimed a large number of them.

Standing here, four hundred feet below the surface of the earth, and six hundred feet above the bottom of the shaft, with a patch of pale blue sky far above us, and inky darkness, almost palpable to the touch, around us, and filling all the depths below, we witnessed the most wonderful scene on which we gazed in Mexico.

Men were sent up to the top of the tiro at the surface of the ground, and told to discharge rockets down it. This they did, and the hissing and explosions of the fiery messengers caused the most deafening echoes and re-echoes, while the sides of the shaft, dripping with ooze and slime, were revealed with startling distinctness by the momentary glare.

But this was nothing to what followed; balls of the fiber of the maguey, or aloe plant, three feet in diameter, and steeped in pine pitch or resin, were swung out over the mouth of the

shaft, and set on fire. When the first was in full blaze, it was detached, and allowed to fall into the abyss. Like a great comet with body of molten metal, and long tail of flame, rushing on a doomed planet, the monster projectile came down from the dizzy height above us, and passing the mouth of the tunnel in which we stood, with a roar more deafening than the loudest thunder, went bounding and crashing into the depths below, illuminating everything, for a moment, with the blinding, lurid glare, followed by a darkness and silence more profound than before. As soon as the tremendous echoes which were awakened by the first, had died away, a second was sent down, and others followed in quick succession.

Most of our party were unable to control their nerves sufficiently to enable them to approach the edge and look up and down the tiro, holding by ropes to prevent them from becoming dizzy and falling headlong into the depths, but those who could do so, beheld a scene, the awful sublimity and grandeur of which beggars all the powers of language.

The remainder of the party now left, and I, in company with the superintendent, clothing myself in a miner's suit, to keep off the water and mud, descended to the bottom of the mine, one thousand feet and more from the surface.

We went down ladder after ladder, along gallery after gallery, through chambers like great churches in size, and others in which we could not stand erect, down steps cut in the rock, and so slippery with dripping water and soft clay, as to compel us to use an iron-shod staff to support ourselves, and through many a winding turning, until we stood at the bottom of the tiro, wet through with perspiration, and trembling with exhaustion.

At the bottom of the tiro is a great pond of water, the reservoir into which all the drainings of the mine are gathered, and the buckets on the great cables, worked by the *malacates* at the top, were constantly coming and going between it and the end of the tunnel six hundred feet above. These buckets will hold three to four hogsheads of water, and are made of

rawhide, in the form of an ordinary Mexican water jar. An iron ring distends the mouth of the bucket, and when the vessel descends, the wet hide flattening down allows the water to rush in, and as the lifting commences, it falls back into its original form, filled to the brim with the dirty fluid. When the bucket reaches the level of the tunnel, it is hauled into the opening, and as the cable is slackened up, it flattens down again, and the water, escaping over the rim, runs off down the side of the tunnel.

But there are still lower depths. We went down nearly two hundred feet more, and at the bottom of the last level, found men at work taking out ore. The dripping of the water at this point is very considerable, and two plans are made use of to get rid of it. A part of the water is carried up to the reservoir in pig skins on the backs of naked and sweating Indians, and a part—the larger part—is pumped up to that point by hand.

The pumps are mere straight logs, thirty feet long, with a bore of three inches, and a piston and bucket, pulled and pushed, back and forth, by two stalwart Indians sitting on either side, working by main strength, without even a lever purchase to help them along. There are stations or reservoirs at the end of each pump, and all must be kept continually working, night and day. The Indian pumpers sit down to their work upon the wet rock, and are as naked as when born; the great heat and want of ventilation at this depth, rendering clothing, if they had it, a superfluity.

They get fifty cents each, per day, and work twelve hours at a shift. In all my mining experience, I have never seen such a waste of power, and such thoroughly primitive appliances for mining.

I went through many of the galleries and drifts, and examined the vein carefully. The main vein is five to twelve feet wide, quite irregular, and runs in a generally southwestern and northeastern direction, dipping to the southwestward as it descends.

It carries metal in a very unequal degree in different por-

tions, and though presenting rich specimens, and bunches of almost pure silver in spots, is not generally very rich.

In one chamber, I saw a number of mules and horses feeding, a thousand feet below the surface. These poor creatures are let down in slings, from the surface, through the tiro, and never go out again alive. They turned their glazing eyes upon us with evident pain as we passed with lighted torches, and appeared to regard us with mournful interest, as in some way connected with the world above, of which they still retained some dim recollection, but which they were never to look upon again.

In another chamber, I saw women and children cooking food for their husbands and parents. They appeared to live here, altogether, probably returning to the light of day only at long intervals. Utterly worn out, at last we climbed our way back to the tunnel, emerging into daylight just as the sun was setting, swallowed a liberal allowance of brandy, to protect ourselves against taking cold, mounted our horses, and galloped back to the city.

The weekly sale of ores at the several mines, is called the rescata. One at the Serrano, I attended. The ore is placed on the ground, each miner's work in a separate lot, and the buyers sample it before the sale. It is sold in the lump, by guess, not by weight, the buyer taking his chances on the amount. The auctioneer stands silent, under an umbrella, while the miners who have a small interest in the sales, over and above their wages, volubly shout the praises of the lot in turn. As each lot is put up, the buyers singly whisper their bids in the ear of the auctioneer, and when all have bid, he announces who bid the highest; the other bids are not named.

The chances for collusion seem, to me, to be very great. Some lots brought as high as five hundred dollars, and the aggregate sales exceeded six thousand five hundred dollars, at this rescata. This ended our sight-seeing in Guanajuato."

The silver mines of Northern Mexico, near the boundary of the United States, are supposed to be of great value, also, but their development has been retarded by the hostility of the

Apache and Comanche Indians, who hold possession of portions of the territories.

Mining operations, however, have been undertaken, of late, upon the Rio Grande, and also over the American line in Arizona territory, the products of which are already reaching the United States. Central America possesses no silver mines that are worked to much extent, but rich ores are known to exist in Honduras, Nicaragua, and Costa Rica.

A very rich mine in Mexico is the one known as the Pachuca, in the group of the Real del Monte, and it has been worked almost from the time of the conquest of the country by Cortes. The most successful operator was Pedro Terreras. a muleteer, who found a shaft something more than a hundred years ago. He made so much money from it that he gave the King of Spain two ships of war, and promised him, if he would visit the country, he should have the ground paved with silver, and should not be required to put his royal foot on the plebeian earth. The king did not come, but he made the enthusiastic Terreras a member of the nobility under the name of Count of Regla. The mines yield about four million dollars annually, and the Regla family is one of the richest in Mexico. The ore yields about a hundred dollars a ton, and the miners are carefully searched every time they come up from their work. They wear only the lightest possible garments, which are changed and shaken whenever the gangs are relieved.

An interesting feature of mining life in Mexico is the search for sulphur in the craters of volcanoes. Popocatapetl and Orizaba are the principal mountains where this substance is sought, and an extensive business is carried on. The sulphur rises in the form of vapor, and is condensed around the crater of the volcano. It requires several years for an accumulation sufficiently thick to pay the expense of collection, and sometimes the work is very dangerous. Men are let down by ropes into the interior of the mountain, and sometimes they are killed by the heat and noxious gases. The miners are a hardy race, and seem to enjoy their venturesome occupation.

The ascent of these mountains is at all times difficult and fatiguing, and very few persons, other than the miners, ever attempt it. Sometimes an adventurous traveler happens along, and is not satisfied till he has made the ascent of one or both of the mountains, but he generally accumulates enough fatigue to last him several months.

Of this number is Mr. D. S. Richardson, United States Secretary of Legation, who, in February, 1877, climbed the peak of Orizaba, or Citlatepetl, as it is called by the Aztecs, the star mountain of the Anahuac. He had previously climbed to the top of Popocatapetl, and from its summit had gazed out over a sea of clouds to the frozen top of its mighty rival, and now the position was reversed. Mr. Richardson was accompanied by Mr. Eustace Morphy, who, with indomitable pluck, held out to the last. The point from which the ascent of Orizaba is generally undertaken is San Andres Chalchicomula, a pleasant little town, which lies directly under the great volcano, at its southwestern base. Here the sulphur-miners and the ice-cutters come down to sell the products of their hazardous industry. The time selected, February 5th, was not at all favorable for the ascent. The miners and guides had all come down, and reported the ascension impossible for several days to come; there had been no such storm in fifty years, they said, and to attempt to go up was simply madness.

Richardson and his companion yielded to their advice, and for a few days engaged in a hunting expedition—which, however, was a failure in so far as finding game was concerned. They saw one rabbit, and heard wolves and coyotes howling; but that was all. They were high up the mountain side, the weather was pleasant, and, as they had plenty of provisions, and no thought of care, they enjoyed the interval with a sense of absolute freedom. It was cold sometimes, and at night the little stars would look down freezingly through the tops of the pines, as if in derision of their foolishness; but these discomforts were as nothing compared with subsequent ones.

At one o'clock on the 10th of February, they began their climb up the mountain. For several hours their path wound

up through the desolate ravines which separate the Sierra Negra from the peak. Great masses of volcanic rock were observed in fantastic shapes on every side, and on the entire face of the country, half covered with snow, could be read the signs of the savage convulsions which some day must have shaken the mountains to their foundations. On the morning of the 11th, the party resumed their march at two o'clock, and the ascent is thus described by Secretary Richardson:

"We were six, all told, four Indians, Morphy, and myself. No party ever tried an ascent with better fellows for guides. They knew every inch of the ground, were strong and good-natured, and took a lively interest in the success of our enterprise. As we were the first to go up after the heavy storms, we went prepared to have a tough climb. The Indians said we would reach the top by ten o'clock, which was giving us seven hours to do it in. Under ordinary circumstances, and when the snow is in the best condition, the sulphur miners go up in five or six hours from the cave, but on the present occasion they had underestimated the difficulties. The snow was low down and very heavy, and long before the sun peeped up over the murky horizon, we were hopelessly launched upon the long, glistening slant, one end of which seemed reaching out to touch the stars, and the other shot far below us into a bank of clouds.

"Sunlight found us on the south side of the mountain, on a level about equal to the height of the Sierra Negra. The ascent now began to be very laborious, and, for the first time, we began cutting foot-steps in the ice in order to proceed. When half way up the mountain, the route usually taken is along a ledge of rocks which reaches up out of the snow like the dorsal fin of a shark, and runs clear to the top. In this respect, Orizaba differs very much from its kindred peak, Popocatapetl. Sharp, jagged points of rock stick out all over its surface like the spines of a porcupine, while the summit of Popocatapetl is a clean, unbroken cone. These rocks on the slopes of Orizaba are one of the principal sources of danger in the ascent, as they often come tumbling down in great

quantities; but at the time of our adventure, they were all held fast by the unusually heavy fall of snow. This was a point in our favor; but if we did not have to dodge rocks, there was no lack of active operations in other respects. The higher we went the more abrupt became the ascent, and the more uncertain the foothold. Ten o'clock came around, and the summit was still far above us.

"Every step now had to be cut out of the solid ice, and the fatigue and light air were beginning to tell on our uninitiated muscles. At eleven o'clock, we were at the foot of what is known as the rocks of the *arrepentimiento*. This is the last grand pull, the home-stretch, and it could not be more appropriately named. It is probably not over three hundred yards to the top, but it is almost a perpendicular wall of ice, and as it is reached when the adventurer is already fainting and about ready to give up, it is a formidable obstacle. We were three hours in getting over it, and then, almost fainting, and completely exhausted, we threw ourselves down on a little shelf of sand at the top of the peak."

It was two o'clock in the afternoon when they reached the summit, just eleven hours after their departure from the Cave of Santa Cruz, which is itself no less than thirteen thousand feet above the sea. Two of their Indians left the party, preferring to climb the mountain the next morning, to spending the night on its top. Mr. Richardson says that that was the most horrible night he ever hopes to pass. He says:

"Shortly after our arrival, a cold wind came up that struck us to the very bone. There was no shelter to be obtained, as the descent into the crater was impossible, and the excavations from which the Indians take sulphur were covered deep with ice and snow. The bald, naked peak presented but one point where it was possible to spend the night. A little below the lip of the crater, on the southern side, a little steam escapes through a bed of sand, and here the snow is melted off a spot about a rod square. Into this sand we scratched a hole, and, pulling our blankets over us, laid down. We had no eyes for the magnificent panorama which was spread out before us,

or the sun, which was going down blood-red in the west; we were too utterly miserable and cold.

"I do not think any of us slept a wink all night. Our blankets froze stiff as boards, and all attempts to light a little spirit lamp and make coffee were fruitless. We could not even drink our wine, for it had turned to ice in the bottles. Thus hour after hour of the longest night I ever spent dragged by, and at length signs of day began to creep up slowly from the east. Almost too stupefied and stiff to move, we were only induced to crawl out from our holes by the stern realization of our desperate situation. The wind, too, now began to go down somewhat, and after moving about a little we felt better. Making our way up to the topmost pinnacle, we planted our flagstaff and unfurled our blood-red banner to the breeze.

"The crater of Orizaba, which is much smaller than that of Popocatapetl, is still an awful chasm, and is probably not far from two miles in circumference. We could not take measurements of it, as all the instruments were down the mountain with the other party. It shows no signs of life, and with the exception of the heated sand on which we passed the night, we failed to notice any evidences of volcanic action still going on. But what a contrast this awful stillness to the great convulsions of which this mountain has once been the center. We had a magnificent view for about an hour after sunrise, and as far as the eye could reach, peak after peak of lesser magnitude told the story of its volcanic birth. By a queer coincidence, I had brought *The Last Days of Pompeii* with me to read in leisure moments, and as I looked out over the world at my feet, and thought of Bulwer's vivid description of the last days of that doomed city, the thought suggested itself, 'who knows how many Pompeiis are buried beneath these hoary hills, and what tales might these rocks repeat if they would?'"

XVI.

CORAL REEFS AND CAVES IN THE PACIFIC.

THE ISLANDS OF THE PACIFIC—HOW THEY HAVE BEEN FORMED—WHAT THE CORAL IS—THE WONDROUS ARCHITECTS OF THE SEA—WHAT A UNITED STATES STEAMER SAW—HOW THE CORAL IS FISHED FOR—ROMANTIC STORY OF A CAVERN—HOW IT WAS DISCOVERED—AN ELOPEMENT AND EXERCISE IN DIVING—LOVE AND TURTLES—A BATTLE IN THE WATER—KILLED BY SHARKS—A MAIDEN'S GRIEF—THE PERIL OF A LOVER—SURPRISING A FATHER-IN-LAW—END OF A SUBMARINE COURTSHIP.

The waters of the Pacific ocean contain thousands of islands far away from the coast. Their presence is recognized, long before they become visible, by clouds directly above them in the otherwise clear sky. The land absorbs the heat of the sun, and accumulates it faster than the water; soon an ascending current of warm air is formed, carrying up moisture into the colder regions of the atmosphere, where it is condensed and forms clouds. A similar phenomenon is observed in our western plains, where the sky is frequently clear enough in the morning, but by ten or eleven o'clock, enough heat has been accumulated to cause the formation of clouds.

The islands of the Pacific are of two kinds, called the higher and the lower. The lower rise but seven, ten, and rarely as high as one hundred feet above the level of the sea; while the higher islands reach an elevation of 10,000, 12,000, and even 15,000 feet. There is no transition between them. The most remarkable are the lower islands. Their appearance is very peculiar. In the first place, the eye is arrested by a white beach; then comes a line of verdure, due to tropical trees; then a lagoon of quiet water, of a whitish or a yellowish color, then another line of verdure, and finally, beyond all, the dark, blue waves of the ocean. Whitsuntide Island is a remarkable model of the structure of these islands:

It is a ring rising seven or eight feet above the sea level, enclosing a lagoon, and presenting the characteristics just described. The lagoon inside is but a few fathoms deep; but on the outside of the island, the water is fifteen thousand feet deep. Here, then, we evidently have a tower-like structure reaching up from the bottom of the sea, and having a depression in its summit. Some of these lower islands are fifty miles across, but most of them are not so large. In some the ring is broken at several points, and these are designated by the Malay word *atoll*.

The island of Tahiti, the principal one of the Society Islands is a good example of the second class or higher islands. It rises seven thousand to eight thousand feet above the level of the sea, has no lagoon in its center, but a crater, and the water around it is very deep. It may, in fact, be considered as a mountain rising to a height of some eighteen thousand feet from the bottom of the sea. Outside of it is a double girdle of low islands, one near, which Darwin calls a fringing reef, and one further out, to which he gives the name of a barrier reef.

On examining these reefs, and the lower islands, their structure will be found made up entirely of animal remains, generation after generation having left their homes, consisting of limestone, to accumulate there. On the top, we find these animals living and growing, in all colors, shapes, and sizes. The highest islands, on the contrary, except those near the continent, like Borneo, Sumatra, etc., are entirely volcanic, and do not contain sandstone, granite, or gneiss, like the mountains of the continent.

The limestone of the lower islands is not due to sedimental deposits from the ocean, but is the work of the coral animal, the great architect of the sea.

The great savant, Prof. Agassiz, describes them as follows:

"These animals are but a sac, like the finger of a glove, only more leathery. Around the mouth is a series of tentacles, formed by a prolongation of the skin. They are all skin, in fact, and have no special organs, yet they digest food with

tremendous rapidity, absorbing it directly. It makes no difference if you turn them inside out; they will digest just as well as before. You cannot kill them by dividing them; for they live all over, like a plant. For this reason they have been called zoöphytes.* If you cut one into eight parts, each part will live and set up in business for itself. Like all other animals, however, they grow out of eggs. The eggs are formed within the skin, which is double, and divided into cells by partitions or septa. When mature, they detach themselves, move about in the water until they find a favorable place, and then establish a new colony. They do not contribute to the growth of their parent colony, which is effected in another way.

"On examining a piece of coral, it is seen to be full of little holes, popularly supposed to be the places for the stomachs of the animals, but this is not so, at all; the coral animal does not form a secretion around it like the mollusks,† but inside, between the two folds of its skin. Coral is, therefore, the bones and not the skull of the animal. As before stated, these animals work in societies or colonies, and their tendency is to repeat the forms peculiar to each species; thus we have corals shaped like a hand, like the branches of trees, like mushrooms, like a brain, with its convolutions. They grow and multiply in these societies by budding or gemmation. The side of the animal begins to bulge out, and the protuberance so formed develops into a new mouth, which soon eats and digests for itself, but does not separate from its parent. This process goes on symmetrically, and produces the variety of regular shapes just described.

"Some distance below the surface, we no longer find these beautiful shapes, but a dense, solid, coral rock. Take for instance, the coral reefs of Florida. Beginning one hundred

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* The term Zoöphyte is applied to simple polyps and compound individuals consisting of many polyps united together, as in most corals. They often branch like vegetation, and the polyps resemble flowers in form.

† Mollusks are invertebrate animals, having a soft, fleshy body, which is inarticulate, and not radiate internally.

and twenty feet below the surface, we first find about thirty feet of massive rock, then the astræa,* then the meandrina,† and about ten feet below the surface the palmata or hand shaped coral. In the shallow mud between the reefs and the continent, there are multitudes of branching corals of the most beautiful forms, colors, and delicacy of structure. The production of coral rock is explained partly by the mechanical action of the waves, and partly by the destruction of the coral insect by the sea urchin and other animals that feed on it. The waves disintegrate the structure formed by the animal, and then roll back the coral sand, thus produced upon it, where it undergoes a process of induration in the course of time.

"It is an interesting question how the structure ever rises above the water level, seeing that the animal which makes it cannot live out of the water. The little architects retain enough sea water to last them over until the next tide, and are so enabled to work up to the highest watermark. Actinia have been observed all closed up on the rock at low water, and then suddenly opened like magnificent flowers, five and six inches in diameter, when the tide rose."

So far, what Mr. Agassiz says of them; now let us try and look at them ourselves. In the hot, summer months, when the waters are bringing forth the moving creature that has life, millions of diminutive, jelly like spawn are thrown out by the parent animal. For a while, they enjoy their freedom, and seem to luxuriate in the exercise of their powers of locomotion, which they are never hereafter to recover; but soon they become weary, and settle down upon some firm, stationary body. At once they begin to change their form; they become star-like, the mouth being surrounded by tentacles, very much as the center of a flower is surrounded by its leaves. After some time, each one of these ray-like parts pushes out extensions, which in their turn assume the shape of tiny stars, and establish their own existence by means of an independent mouth. In the meanwhile, lime has been deposited at the

* Astræa, a coral in the shape of a star.

† Meandrina, a genus of corals with meandering cells, as the brain-stone coral.

base of the little animal, by its own unceasing activity, and forms a close-fitting foot, which adheres firmly to the rock. Upon this slender foundation arises another layer, and thus by incessant labor, story upon story, until at last a tree has grown up with branches spreading in all directions. But where the plants of the upper world bear leaves and flowers, there buds forth here, from the hard stone, a living, sensitive animal, moving at will, and clad in the gay form and bright colors of a flower.

This flower is the animal itself, seen only in its native element, and unfit for air and light. What we call coral is its house, outside of which it prefers to live, rather than within.

How they build their dwelling, human eye has never seen. We only know that the tiny animals, by some mysterious power, absorb without ceasing the almost imperceptible particles of lime which are contained in all salt-water, and deposit them, one by one, in the interior. This is done, now more, now less actively; and the denser the deposit is, the more valuable the coral. Gradually this substance hardens and thickens, until, in the precious coral, the *Isis Nobiles* of science, a large tree is formed, which often reaches the size of a man's waist. It is perfectly solid and compact, and adorned on the surface with delicate parallel lines. Thus, on the tree-shaped limestone, grows the life-endowed body of the polypus; it moves, it feeds, it produces others, and then is turned again into stone, burying itself in its own rocky house, whilst on its grave new generations build unceasingly new abodes.

This is the so-called blood-coral, the favorite of antiquity, and the fashion of our day—next to the pearl, the most precious jewel of the deep.

It is not easy to obtain a piece of living coral, for the purpose of studying its wondrous structure, and admiring its exceeding beauty. The great depth at which the mysterious little animals dwell in the ocean, secures them against the mere amateur fisherman; and the professional coral-fisher in the Mediterranean, the son of superstitious races of Southern

Italy, is even extremely reluctant to admit outsiders into the secrets of his trade. However, they [illegible] superficially. As a proof of this assertion, we cite the following example:

The United States Steamer Gettysburg, while on her way from Fayal to Gibraltar, recently made a discovery of considerable importance, in the shape of an immense coral bank (hitherto totally unknown), in latitude 36° 30′, longitude 11° 28′. Partial surveys were made, and the least depth of water noted was one hundred and eighty feet, which, in mid-ocean, is very significant. Twenty miles west of the bank, the sounding line marks sixteen thousand five hundred feet, and between the bank and Cape St. Vincent, twelve thousand feet. The commander of the Gettysburg believes that in some portions the coral rises to the surface. How such a reef, in a part of the ocean which is constantly traversed by vessels, can have remained undiscovered is almost inexplicable. It is also stated that the bank is rich in valuable coral of light pink shades of color.

The coral fishing is done in this way: a large net is fastened by a stout rope to the stern of the vessel. At the end of this rope hangs first an iron cross, consisting of two hollow tubes, laid cross-wise, through which strong ash poles have been thrust, and to this are fastened a number of old sardine-nets, no longer fit for their first purpose, and countless ends and bits of wide-meshed pieces of rope, as thick as a finger—the whole apparatus a mass of rags and rotten net-work. But the more such wretched-looking pieces of net-work the fisher can fasten to his iron cross, the better are his chances. When the sea is perfectly quiet, he lets them sink down to a depth of sixty or even a hundred fathoms, where they slowly spread and unfold themselves over a vast extent. Now the vessel proceeds slowly on in the manner of our trolling, and as soon as the skilled hand of the fisher observes that the rope pulls, and consequently something is fastened to the net, he pulls it slowly up, and the treasure, if any there is, is heaved on board with great care, and now comes the task of picking out

the precious treasure from the meshes of the net-work, and to loosen them from the fragments of stone on which they are growing.

The only way to examine the living animal is to seize the little fragment of rock, or the shell to which the mysterious creature is fastened, at the very moment that it appears near the surface, and to dip it, if possible, without exposing it to the air, immediately into a vessel with salt-water, which you hold ready for the purpose. At first, there is nothing to be seen but a vague, indistinct mass of grayish substance. You suspend the animal and its tiny abode by a string in the middle of the glass globe, and carry it to a dark place; for the coral will not display its beautiful form and colors in the gleaming light of the day. It takes hours, often, before the obstinate little creature condescends to give a sign of life.

At last the club-shaped extremity of the dingy red substance begins to wrinkle up into little rings here and there. Looking now with a magnifying-glass you perceive with joy, that the eight star-shaped identations assume a white tinge, and the red grows every moment to a more lively hue. The lines widen, and soon the whole resembles a beautiful flower of eight leaves.

We have seen that those wondrous little animals in length of time have built mountains to a height of fifteen thousand feet. The coral islands and reefs are but just above the surface of the water, except in cases where they have been lifted by earthquakes or other internal action, after the little architect of the sea had done his work. Many of these coral islands are of circular form, with an opening which will admit the passage of boats, and sometimes of ships. The waves break on the outer edge with that long, steady swell peculiar to the Pacific, but on the inside the water is as calm and peaceful as that of a mountain lagoon. Sometimes the coral reefs have been formed around the volcanic islands so as to encircle them completely, except at a single opening. In such cases, they make excellent harbors between the reef and the island: the harbor of Tahiti is a splendid specimen of this kind of work. The reef surrounds the island in such a way as to make a lagoon of still

ance, like the moat around a castle. The entrance is deep, and sufficiently wide to admit ships of every size.

On many of the volcanic islands there are caverns, some of them of considerable size, and often of great depth. Runaway slaves frequently hide in these caverns, and they are also resorted to by the natives in times of warfare. There is a cavern in the Island of Hoonga, one of the Tonga Islands, which has a romantic history from the use that was made of it by the man who discovered it.

One day a young chief of Hoonga was out on a fishing excursion, and caught sight of a large turtle. The turtle dived, and so did the chief, leaving his canoe floating on the surface of the water. The natives of nearly all the Pacific islands can swim like seals; they are in the water and learn to swim almost as soon as they learn to walk. It is commonly said that a Feejee baby will swim instinctively, like a puppy or a kitten; but this is not strictly true. The natives think nothing of swimming a mile or two at a time, and they frequently get up swimming matches, in which they show great speed and endurance. The accomplishment is not confined to the sterner sex; girls and women swim as well as boys and men, and frequently the girls carry away the prizes in the swimming matches. It is proper to say that they are not as elaborately dressed as the young ladies of New York and Paris; on some of the islands nobody wears any clothing whatever, except a little oil rubbed over the skin, to keep out the water. Since the missionaries settled in the South Pacific, more attention is paid to dress than formerly; but the quantity worn is surprisingly small, and would not admit the wearers to a fashionable party in America.

The young chief dived for the turtle, and the two had a lively race. The turtle went into a hole in the rocky shore, and the chief went after him. The turtle disappeared, and the chief rose to the surface of the water to regain his boat. But instead of finding himself in the open air, he was in a cavern, a hundred feet wide and twice as long, with a dome as high as the roof of an ordinary church. It was lighted from

the water and from a few crevices in the rock, where nobody could reach them. On one side there was a floor of solid rock smooth as the best sidewalk of a city, and evidently the resort of the turtles of that neighborhood. He explored the cavern and concluded that he had hit upon a good thing, and would keep it to himself. Taking a new twist in his neck-tie, adjusting his collar, and seeing that his diamond pin was well fastened, he dived into the water, swam outside, and rose near his canoe. With his thumb on the side of his nose, he paddled home, lighted his gas, and sat down in his easy-chair.

He was not a married man, but he had hopes in the direction of matrimony. He loved the daughter of an old chief whose tribe was then at war with his own, and as long as the war lasted there was no hope for their union. His tribe was preparing for an assault upon the other, and the economical custom prevailed there of eating all who were killed or made prisoners. His tribe was more powerful than the other, and if the battle should be on the side of the stronger party, they would have the pleasure of devouring the vanquished ones. He had no particular objection to eating, or seeing his friend eat, the body of his father-in-law, and especially that of his mother-in-law, — many a married man in America can understand his feelings, and sympathize with them, — but he did object to seeing his bride roasted or fricasseed; so he studied out a plan to save her from the gridiron or stewpan.

He managed to communicate with her the next day, and told her to meet him at a certain place on the shore, at a appointed time, where he would be ready with his canoe. He was there on time, and she came, with her waiting-maid, who carried their entire wardrobe in an old bottle. A quart of cocoa-nut oil was sufficient to dress her for several days, and it did not take long to pack up. They entered the canoe, and the chief paddled them to the cave, which they reached just as the sun was rising.

"Dress yourself, my dear," said he, as he ceased paddling, "and have your maid do likewise."

She poured out a handful of the oil, and rubbed it over her

porphyry-coloured shoulders, so that she could slip easily through the water. Her maid followed her example, and then fastened the bottle to a string around her neck.

"Now, if you're ready," said the lover, "follow me."

"Ready," was the response.

He went overboard, and mistress and maid went after him.

Down they dived like three dolphins, the princess keeping close at his heels, and the maid following the princess.

The lady had some misgivings when they entered the hole in the rocks, but she concluded that her lover knew what he was about, and therefore she asked no questions. In fact, she could not talk at that time, as any one familiar with efforts at subaqueous conversation can testify.

They rose in the cavern, and clambered out upon the solid floor, disturbing half a dozen turtles, and capturing one of them just as he was sliding off into the water.

The princess was delighted, and so was the maid, who thought the place one of the jolliest she had ever seen. They talked about the best plan to arrange the house, and laughed to think what a commotion her absence from home would create. After an hour or so he left her, promising to bring some furniture, and fit up the establishment, so that they might start at housekeeping in good style.

There was a precious row in Oklingee's palace when he found that his daughter had disappeared. He searched through his village, but could find no trace of her; and, after several hours of fruitless endeavor, he came home, and for the first time discovered that she had taken the bottle of cocoa-nut oil, and then he knew that she wouldn't return in a hurry, and that her absence was premeditated. He did not know that anybody was in love with her, but very naturally suspected that she had eloped with some young man. His rage was great, and he ordered all the youths of the tribe to be sent before him.

All came, and were closely questioned. None of them knew anything about the princess and her flight, and all were able to prove where they were the night before. His anger

was partially appeased when some one brought in a prisoner freshly caught, who was immediately killed and served up for dinner.

Oklingee's wrath turned to grief, and he determined to bring on a great battle at once, by way of distracting his sad thoughts. Moreover he suspected that his daughter had been stolen by some of his foes, though his spies brought him word that she was nowhere to be seen in the camp of the enemy.

Meantime the lovers were happy in their new home, though the visits of the young chief were never of long duration. He carried her a liberal supply of mats for bedding, and kept the place well stocked with cocoa-nuts and other things good to eat. Anything that would be injured by the water was carefully wrapped in a shark's skin before it was taken to the cave, and as the skin was quite water-proof, the articles did not suffer in transit. It was no easy work for the youth to dive and swim into the cavern with a bundle fastened to his neck; but love gave him strength, and he was ready to undergo any hardship for the sake of his heart's idol. She reciprocated his kindness, and arranged all the mats and other furniture so that the house was quite comfortable, and even luxurious.

The turtles did not approve of the invasion of their home, and made up their minds not to live in the society of the moonstruck couple and their servant. As the latter showed no disposition to leave, the former abandoned the place, though now and then one made his way there and climbed upon the rocky floor. When the splashing of the water denoted the approach of a turtle, the princess and her maid would quietly slip aside, and leave him to pick out the spot he wanted and go to sleep. They would then stealthily approach him, and turn him on his back, where he would be helpless. Cutting off his head was the next step, and by the time the chief made his appearance the turtle would be ready to take home. He was thus able to account to his friends for his absence, as he took a turtle home nearly every day, and was greatly praised for his skill in the chase.

One day a fellow who had been unfortunate in turtle fishing, and taken nothing for a fortnight, determined to know the chief, and find out where he had so much good luck. He paddled his canoe silently along, keeping some distance in the rear, so that he was not noticed by the lover. The latter reached the cave, and was so intent on seeing his sweetheart that he did not think to look around. Taking a bag of cocoa-nuts, he dived and rose as usual. The other waited a long time for his reappearance, and at last was rewarded by seeing him come up dragging a turtle, which he lifted into the canoe. Just as he was picking up his paddle, he discovered the spy, and knew that his secret, or at least a part of it, had been found out.

The other laughed, but his laugh was brief, as the lover went for him, and there was every promise of a fight. The canoes met with a crash, and the men grappled and fell into the water. Their struggle was long, as neither had any weapons or clothing, and their oily skins did not offer good holding-ground for their hands. At last the chief had the spy by the throat, and at the same time struck him a violent blow on the nose, so that the blood spurted out.

The waters of the South Pacific swarm with sharks. Some of these grow to a considerable size, and are strong enough to seize a man and kill him. They rarely attack the natives; there seems to be a friendliness among the sharks and the natives, as the latter can swim among them with almost complete safety, while a white man would be caught in a moment. It sometimes happens that a group of natives will be bathing and frolicking in the water with sharks all around, as inattentive as though nothing were near them. But let a white man join the party, and he will instantly attract the sharks. A white cloth thrown into the water will bring them around; anything white seems to draw them and receive their attention. It not unfrequently happens that sailors who have incautiously put their naked hands or feet into the water over the sides of a boat have had them bitten off by sharks.

Blood also attracts them, and where there is blood, the make no distinction between natives and foreigners. In th present instance, the lover had drawn blood from his anta onist, and it instantly occurred to him that both their liv were in danger if any sharks were around. He released h hold, dived under his canoe, and swam away a hundred fe or more, so as to be out of the vicinity of the blood he h drawn.

As he rose to the surface and looked around, he saw th the spy was just recovering from the force of the blow. E head was above the water, and his hands were moving as if were slowly swimming towards the rocks. Suddenly gave a shriek, and disappeared as if drawn under, and t lover then knew that his expectations were not incorre But with a taste of blood the sharks would be likely to attac him, and he therefore swam farther away, and climbed upon small reef just even with the surface.

Fortunately a light wind came up and blew his cano towards him. When it was near the reef he swam out an reached it, and then paddled home with his turtle. For tw days he did not go out again; partly through fear that th sharks might be around the spot where his antagonist wa killed, and partly in order to allay any suspicions that hi previous movements might have aroused.

When he next visited the cavern, he found his princes greatly distressed, and almost dead with grief. Soon afte his last visit her maid took it into her head to go outside She dived into the water, and rose close to the foot of the clif The lover had been gone an hour or more, but an empty cano was floating not far away, and near it a dozen sharks wer quarrelling over something which she naturally supposed wa the body of the owner of the bark. Of course she thoug that the canoe must belong to the young chief; and whe she returned and told her story, it is no wonder that th princess went into hysterics. On the next day he came no and they then knew that he was lost. Their grief had bee great, and so were their surprise and relief at his return.

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BATTLE OF THE WARRIORS

He went and came safely. Next day the warriors went out to battle, and the stronger tribe was victorious. The slain were eaten, and the prisoners were reserved to be killed whenever wanted. Among the latter was Oklingee. The young chief had shown great courage in battle, killing two of the fiercest and stoutest warriors with his own hand, and his people were consequently inclined to do the handsome thing by him. Oklingee was old and lean, and the young chief easily persuaded his people to let the patriarch live. The old fellow was gratified at being saved from the hash-mill for the present, and asked the youth what he could do for him.

"Give me the hand of your daughter," said the young man, respectfully.

"Certainly, my dear boy," said Oklingee; "not only her hand, but her entire self, provided you can find her. She has eloped, and I don't know where she is."

"I will show you," said the youth, as he led his prospective father-in-law to his canoe, and seated him on a mat in the bottom. Then he summoned his friends, and together they paddled their light canoes in a gay procession over the water. Near the mouth of the cavern they halted, and the chief jumped overboard.

While all were wondering at his strange behavior, he reappeared with his tawny princess at his side. Everybody was surprised, and the old man gave the happy couple his blessing. The wedding was appointed for the following Sunday: cards were issued to all the relatives, the prisoners that had been held over were killed and roasted, and everybody was happy.

XVII.

BURGLARS AND BURGLARIES.

REMARKABLE BURGLARIES. — UNDER GROUND FOR DISHONEST PURPOSES. — WONDERFUL ADROITNESS OF BURGLARS. — A REMARKABLE ROBBERY. — OCCUPATION OF A LAWYER'S OFFICE. — LABOR UNDER DIFFICULTIES. — A TROUBLESOME POLICEMAN. — STRANGE SCENE IN COURT. — THE CULPRIT'S REPLY. — ROBBERY BY COUNTERFEIT POLICEMEN. — THE OCEAN BANK ROBBERY. — RAPID AND THOROUGH WORK. — AN ASTONISHED WATCHMAN. — BAFFLING THE POLICE.

LABOR under ground may be performed for a bad, as well as for a good purpose. It may be for dishonest gain, or it may be to secure a place of concealment for stolen treasures or for those who steal them. In the performance of this kind of labor, men will frequently display ability and enterprise sufficient to insure them a good living and ultimate independence in an honest calling. They overcome obstacles of great magnitude; constantly risk their lives and liberty, and frequently fail to obtain any reward; their enterprises are hazardous; and where they promise great returns they very often fail to redeem the promise. Men who plan great robberies frequently show the qualities that would make them prominent in an honest pursuit; they may spend half their lives in prison, when they might be honored and respected if they chose to be so; but they deliberately decide that honesty is not the best policy, and accept the career, which is certain to cover them with dishonor.

Some years ago there was a skilful and successful robbery of a jewelry store in Manchester, England. The store was entered between Saturday afternoon and Monday morning; the safe was opened and goods to a great value were taken; the occupants of the store had bought their safe only a few

to this before; it had been warranted fire and burglar proof, but they at once brought suit against the makers of the safe to recover the value of the goods that were stolen.

When the trial came on, one of the counsel stated that a man in prison for another offence, had acknowledged to a share in the robbery of the jewellers. With the consent of both parties the man was brought into court to testify to the matter, and say how it was performed. As he entered the room everybody became silent, and all eyes were turned towards him.

They had expected a low, mean-looking fellow, with the face of a bull-dog, and the general appearance of a brute. Instead of such a man, they saw one whose bearing was erect, and whose face denoted intelligence. He took his place in the witness box, and when everything was ready he began his story. He gave the history of the robbery at length, and detailed each step of the proceedings. His manner was captivating, and at times he displayed enthusiasm and eloquence that would have fitted him for the position and honors of an advocate.

"We watched the store for more than a month," said he, "so as to learn the habits of everybody around it. We found they shut up Saturday, and no one went near the place till Monday morning, and so we fixed on Saturday night and Sunday as the best time to work. There was a lawyer's office over the store, and the lawyer went away about three o'clock on the afternoon, and didn't come back till ten the next morning. Sunday he didn't come at all, and so we were sure of him.

"We went into his office every day for a week before we went to work; but of course we didn't touch anything. We laid out all our plans in his office, and smoked his cigars, and I will do him the credit to say they were excellent. As soon as he was gone that Saturday, we went into his office, took up the carpet, and then lifted the boards in the floor. We made a hole three feet square down to the laths and plaster of the ceiling of the jewelry store. Then we waited till the store

was shut; and it hadn't been shut five minutes before a little hole in the ceiling large enough to push down a closed umbrella.

"We got the umbrella down, and then opened it, so would catch all the rubbish, and thus prevent our mak noise. When we were ready to go into the store, we arrange things so as to work systematically. We l all our plans for this beforehand.

"A gas-light was kept burning in the store, and th a hole in the shutter, so that anybody could look in. A man passed the store once in every fifteen minutes his duty to look in every time, and I can say for him did his duty. The man who was to work at the safe lie on his side in full view of the peep-hole; but by over twice he could get under a counter and be out o

"There were five of us in all. One was to work safe, with a string tied to his toe. This string was he man who sat on the edge of the hole in the lawyer' Then a man was at the lawyer's window, and anotl walking up and down the opposite side of the stree fifth man took turns at the safe, so that we should time in resting.

"When the policeman was coming, the man in th made a signal to the man at the lawyer's window. T signalled the fellow at the hole, and pulled the string The man at the safe then rolled under the coun staid there till the policeman had looked in and gone when the signals were repeated, and he rolled out a to work again.

"We lost five minutes out of every fifteen in this w at one time we thought we should have to give up. into the safe, though a little after midnight; and then i take long to empty it of all we could carry. We were the store by one o'clock Monday morning, and took a train to London."

The burglar then went on to give a description of t cess of opening a safe. He said that it was a rule with

burglars that any safe could be opened, provided there was a place anywhere for the insertion of a wedge. "If we can get a wedge in anywhere," said he, "the safe is bound to open, even though the first wedge is no thicker than the blade of a knife.

"All we want besides proper tools is plenty of time, and there never was a safe manufactured that cannot be opened if you give us time."

He then described the advantages and disadvantages of the safes made by different manufacturers.

"A's safe can be opened by a skilful man in twenty hours; B's in fifteen hours; C's in eleven hours; D's in nine hours, and as for E's," mentioning one that had recently come into trade, "we consider it no more than an ordinary trunk, as we can open it in half an hour.

"There is no safe made that cannot be opened inside of thirty hours, and if we can be sure of not being disturbed for that time, we are certain of our game. Any safe will answer its purpose, provided the intervals of visiting the place where it is kept are never so great as the time required to open it."

As the man finished his story, and was taken from the court to go to prison, the judge asked him why he did not abandon burglary and live honestly. "Your story," said the judge, "shows that you possess sufficient intelligence and ability to make you a master mechanic in a very short time, and if you would lead a respectable life you could be sure of a good living."

The burglar turned to the judge, and replied with great earnestness, "I am as proud of my profession as you are of yours, and have no desire to leave it. I stand high in it and the praise and admiration of my associates are just as dear to me as the praise and admiration of a shopful of mechanics would be to their master. Besides, we run risks that mechanics do not; we must have the skill to baffle the police, and save ourselves from arrest, while the mechanic needs nothing of the kind. The greater our danger, the greater is the respect shown to us; and one reason why we

love our profession is, because there is so much danger in it. And any skilful and experienced burglar will tell you so."

The man went back to prison to serve out his sentence for the crime of which he was convicted. Doubtless the notoriety he had obtained by his appearance in court was of great assistance in consoling him for his imprisonment. He was proud of his accomplishments as a burglar, and seemed to take his incarceration more as an honor than a disgrace.

In this country there have been several robberies of the higher sort, such as entitle the perpetrators to great praise for their skill, although it was shown in a bad cause. Among these may be included the famous Philadelphia Bank robbery, a few years ago, where the burglars actually informed the bank officers that an attempt was to be made against them. They proceeded in this wise: —

One afternoon, a little before the close of business hours, a man in the uniform of a policeman entered the bank and asked for the cashier. On meeting that official, he stated that he had been sent by the police captain of the precinct, whom he named, to warn them that there was reason to suspect that an attempt would be made that evening to rob the bank. He said an extra policeman would be detailed to watch the bank, and another extra man would be placed on the beat. The cashier thanked the man for the information, and told him to give his compliments to the captain. The man then departed, and the bank officers, after notifying their private watchman, closed the establishment and went home.

Of course the private watchman was on the alert, and kept a sharp lookout. About ten o'clock a policeman appeared, and asked if there had been any suspicious movements around there. The watchman said there had been none; and while they were talking another policeman appeared, and joined them in conversation. The first was the extra to watch the bank, and the second was the extra on the beat. The watchman opened the door of the bank, and allowed them to enter, so that they could see the approaching thieves without being seen.

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the three were fairly inside, there was a sudden
the state of affairs. The door was closed, the
was knocked down, bound, gagged, and carried
resident's room, where he was seated in a comfortable
One of the men drew a pistol and sat in front of
other opened the outer door, blew a small whistle,
minute half a dozen men, as nearly as the watchman
dge, entered the building. The door was closed
hem, and the party went at work to open the safe.
, and as silently as possible, their work was per-
The watchman, from the place where he was bound,
see, but he could hear, and he knew they were at
h drills, blow-pipes, wedges, and the other imple-
the burglar's trade. Hour after hour passed, the
, bound and gagged, being guarded by his vigilant
In telling the story subsequently, he said he was
reated by the man who guarded him. At his request
de that held his arms were loosened, and the gag in
uth was placed where it would least inconvenience
Whenever he complained of thirst, his keeper gave him
of water from a pitcher in the room.
hour or so before daylight the robbers opened the safe,
ared their plunder. Hastily packing it into the bags
d contained their tools, they departed, leaving their
hind, and leaving the watchman securely fastened in
ir. He was ordered not to stir for an hour: bound as
, he could not stir until some one came to his assistance,
the parting injunction of the thieves was entirely
nous. The amount of their plunder was never posi-
made known to the public, but was understood to be
than two hundred thousand dollars — a very fair
ation for the work of a single night.
the many successful bank robberies that have taken
on this continent, the Ocean Bank burglary ranks among
most for its ingenuity and skill, and for being a com-
puzzle to the most experienced detectives of the city
York. Although an investigation by the police

authorities was begun within a few hours after the discovery of the robbery, no clew was ever obtained, or, at any rate, given to the public, of the perpetrators; and to this day the whole matter has been involved in mystery, and probably will ever remain so.

The maxim of war, that the reduction of every place, however strong, is possible, must be equally true in the art of thievery. It is evident that no vault can be made impregnable; no lock can be contrived by human ingenuity, with all its mechanical appliances, that will prove superior to other human ingenuity; no system of watching can make property entirely safe against the patience and acuteness of men who give good faculties to the science of stealing.

The premises occupied by the Ocean Bank were at the corner of Greenwich and Fulton Streets, New York, a locality much frequented by day and night. One would imagine that an attempt at robbery in this locality must be detected very quickly, provided the policemen and the watchers employed around the neighboring stores performed their duty. The robbery occurred between one and three o'clock on the morning of the 28th of June, 1869. It appears that there was no regular inside watchman employed by the bank, but they had an out-door man employed to watch the premises.

It is supposed that the robbery was planned many weeks before it took place, and one or more persons familiar with the thorough workings of the bank were suspected of being, to some extent at least, participators in the enterprise.

The basement of the premises in question was occupied by a Mr. William Okell, a gentleman well known in the city, and doing business as a broker. Having more room than he required for carrying on his business, he rented out several small offices for business purposes. In the early part of June, a man giving the name of Charles K. Cole, and representing himself as an agent for an insurance company in Chicago, engaged one of these rooms; and to him is given the credit of planning the robbery, in connection with others.

Immediately above the office rented to Cole was the

president's private office, and through the ceiling of this office an entrance was made sufficient to admit a man's body. From the subsequent examination by the detectives, it appears that holes were drilled through this ceiling from above and below, as the Brussels carpet in the president's room contained no holes, which would not have been the case had the drilling been done entirely from the basement.

It was urged by some that this drilling through the ceiling and large beams must have occupied weeks, while other experienced officers asserted that it could have been accomplished in a few hours. One of the severed beams was four inches thick by fourteen in width. Some believed that an entrance was effected through the side door, and that the person or persons had a good knowledge of the employees, where the safes were, the contents of the vault and safes, and the key to the combination lock.

The discovery of the robbery was made by the colored man up stairs, on Monday morning, when he opened the bank, in his usual way, to clean the offices. He detected a strong smell of powder, and went into the rear office to find out the cause of it. There he was astonished at the view which met his Ethiopian eyes.

On the floor of this office were the vaults and safes. Here he observed several caps of different descriptions, six or eight in number; overcoats, blouses, and overalls, such as are used by machinists; oil-cloths, rubber shoes, saws, bits, awls, jack-screws, drills, lanterns, and every other kind of implement used by expert thieves. The instruments were gathered together and taken into the possession of the police, and a cabinet of four hundred pieces was made of them.

The vault and safes were found to have been broken open; United States bonds were lying scattered about, as well as large quantities of coin and currency, mixed with which were small wedges, railway bonds, copper coin, augers, chisels, flasks of powder, any quantity of cigar stumps, which showed that the burglars took the situation very coolly, pieces of chilled iron, fuses, gold certificates, and other valuable securities.

Just outside the vault was placed a very heavy bag of gold, which had been lifted out; but owing, probably, to its great weight, it was abandoned. Tin boxes had been burst open and thrown in all directions, as well as the securities which they had contained, and everything betokened the utmost recklessness in ransacking the safes. When all this disorder and chaos met the porter's gaze, he became half bewildered, and did not know how to act; he thought he might be arrested for what had been done by others, and for a few minutes he contemplated flight. He had been through the rooms at one o'clock A. M., on the same morning, and found everything secure, so that it was plain the robbery had been done in a very short time. He, at last, raised an alarm that the bank had been entered, and in a short time Captain Steers, of the twenty-seventh precinct, took possession of the bank until the officers arrived.

When the robbery became known, the city was thrown into intense excitement, as it was rumored that over one million of money and securities had been stolen. The bank was quickly besieged by depositors and other interested parties, together with the usual assembly of curiosity-seekers. The depositors were perfectly uncontrollable; and at one time it seemed that they were going to lay hands on money, or securities, found outside the vault, and make themselves secure against loss. The police, however, kept them at bay, and kept them out of the building. At length the bank officials appeared on the scene, in company with the bank's legal adviser; and after a short sime they issued a statement that only about twenty thousand dollars had been stolen.

This report kept down the excitement, but the depositors really did not know whether they were safe, or utterly ruined. The detectives took charge of the case, but, as stated at the outset, they were unable to cope with the matured plans of the thieves, and did not succeed in bringing any of them to the bar of justice.

The vault was in the president's room, at the rear of the premises. It was defended by an iron door, having a combi-

lock. This door was blown open with the gunpowder
ind attracted the porter's attention. The door being
everything in the safe was accessible. The keys to
ond door hung on the inside of the one that had been
open by the action of the powder, and it is hardly
ry to say that the thieves made good use of them
third door was forced open with a powerful screw, the
e being sufficient to depress the floor under the door.
ere two safes; one contained the securities of the de-
, and the other the property of the bank
boxes of the depositors appeared to be the principal
on for the thieves, and paper securities were preferred
gold which stared them in the face. These boxes
completely overhauled, and securities to the amount
at five hundred thousand dollars were abstracted; one
tor having lost as much as fifty thousand dollars, for
the bank was in no way responsible.
ut thirty thousand dollars belonging to the bank, in
and currency, were stolen. The thieves overhauled
thirty thousand dollars in Clearing House currency,
could have been negotiated, as well as thirty thousand
in gold coin, but which they did not touch.
detectives went to work, and it was said that one or
of the bank's officials were suspected, and closely
ed for some time subsequent to the robbery. Two men,
were said to be the most daring and accomplished bank
s in the city, were suspected; but no trace could be
ed of their having been seen near the Ocean Bank.
e men were supposed to have committed a robbery, just
ously, at the National Bank of New Windsor, of some-
like one hundred thousand dollars. A number of ex-
English burglars had also arrived a short time before the
ry, but nothing could be brought against them.
the third day after the burglary, a patrolman, in Eliza-
Street, about three o'clock A. M., met two young lads whom
new. Suspecting they were up for no good at that hour
the morning, he spoke to them. They informed him that

there was a large trunk standing on the sidewalk, opposite No. 8 Elizabeth Street. He went to the number indicated, and there found the trunk, as they had described. On it was a card directed to Captain Jourdan (late superintendent of police), of the sixth ward. The trunk and the two boys were taken to the station-house.

When Captain Jourdan was summoned, and the trunk was opened, it was found to contain unnegotiable securities, to the amount of three hundred thousand dollars, which had been stolen from the Ocean Bank. The property consisted of bonds, checks, securities, and currency, together with legal documents, such as conveyances and mortgages; but no clew could possibly be obtained as to the sender of the trunk.

The total loss sustained by the bank proved to be about twenty-five thousand dollars, out of the bulk of the valuables and money stolen; but as the property returned to Captain Jourdan principally belonged to the depositors, their loss was estimated to be something near half a million of dollars.

The various implements found at the bank were valued at two thousand dollars, and were of the very finest finish; some of the pieces were worth as much as two hundred dollars, and three hundred dollars each.

Altogether, it was one of the most skilful, ingenious, and well-planned robberies ever committed in this country. The most singular part of the robbery is that, although an outside watchman was employed to guard the premises, no one was seen to enter the bank, or the basement of the building; neither was any one seen to leave the premises at any time of the night or morning when the robbery took place.

XVIII.

THE EARLIEST EXCAVATIONS.

GRAVES AND THEIR CONSTRUCTION. — DIFFERENT MODES OF BURIAL. — TOMBS — THE MOST EXTENSIVE TOMBS. — OBJECT OF THE PYRAMIDS OF EGYPT. — A VISIT TO THE GREAT PYRAMID AND ITS DESCRIPTION. — DIFFICULTIES OF CLIMBING. — THE TOMBS OF THEBES. — A FAT AMERICAN'S ADVENTURE. — ENTERING THE TOMB OF ABD-ASSEEF. — REVITING POETRY UNDER DISADVANTAGES. — SWALLOWING A BAT. — JACK'S DISGUST. — FATE OF A FAT MAN. — STUCK IN A PASSAGE-WAY. — HOW THE ARABS REMOVED HIM.

THERE is little or no reason to doubt that the earliest excavations ever made by human hands were for purposes of sepulture. The burial of the dead, or rather the disposition of their bodies, has been a necessity in all countries and all ages since the days of the Garden of Eden. Some nations have practised cremation, and there are many arguments in its favor; but with most of these nations it was the custom to gather the ashes of the dead into urns, which were buried with much formality. Among some of our western tribes of Indians the bodies of the dead are placed on scaffoldings of poles several feet high, and there left to the action of the elements. This practice had its origin in the absence of all tools suitable for digging in the earth, and possibly from a vague theory that the body of the deceased should be raised towards the home of the Great Spirit beyond the skies. Some of the ancient nations had a theory concerning cremation, which was, that the flame, rising towards heaven, carried the spirit of the deceased and enabled it to reach the mansions of the blest. On the same theory the Chinese write or print their prayers on paper, and then burn the paper; the flame carries the prayer upward, and as light and heat come from

the Controller of the universe, they are considered the proper vehicles for the transmission of appeals to his mercy, his pity, and his infinite love.

The earliest form of sepulture was in the grave, a simple trench a few feet in depth. With the dawn of civilization came the tomb, rudely constructed of stones piled together, or cut out of the solid rock. The most elaborate specimens of the latter kind of tomb are in Egypt; thousands of years ago they were constructed, and to this day they remain, and are regarded with wonder by travellers from all the nations of the globe. The most extensive tombs of modern times bear no comparison to those which are found in the lands bordering on the Nile. The pyramids of Ghizeh, immense mounds of stone, and constructed with the greatest care and engineering skill, are the tombs of the rulers of Egypt in the days of her greatness and prosperity. The pyramid of Cheops rises to a height of nearly five hundred feet, and is of proportional width at its base. Down deep in its centre is the coffin of the man whose name has been given to the pyramid: thousands of years have passed since this huge tomb was constructed, and it will doubtless remain for thousands of years to come. No tomb of modern times approaches it in grandeur, or gives promise of outlasting it.

Though the opposite of underground in their character, and erected rather in the interest of death than in that of life, the great pyramids deserve a description here. Excavations were made for their foundations, and the interior chambers, where rest the coffins of those for whom they were erected, are, for all practical purposes, as much underground as they would be in the deepest coal mine of England or America. The pyramids are mostly on the west bank of the Nile, not far from Cairo; tourists designing to visit them make Cairo their starting-point, and from that city several groups are in full view. Altogether about seventy pyramids have been counted in this region, and the remains of many others are visible. Decay's effacing fingers are constantly at work; forty centuries have passed since the pyramids were erected,

AUSTRALIAN NATIVES BURNING THEIR DEAD.

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ed their durable character can be readily inferred when we remember how long they have stood.

A sepulchral chamber was first excavated in the rock, and during the life of the king who was to repose within it, the work of building the pyramid was pressed forward. It was generally completed before he died, and therefore he had the consolation of knowing that he would not be kept waiting around for his tomb to be constructed. The structure was made over this chamber, an elegant coffin of stone being first placed within it. A passage-way about four feet high and three feet wide was kept open, so that the body of the king could be carried to the sepulchral chamber when the proper time arrived for depositing it in its coffin. The pyramid was practically solid, as the chamber and passages leading to it were the only hollow spaces. The sides of the pyramids were directed to the four cardinal points of the compass, and their exactness in this particular leads to the supposition that the ancients were acquainted with the principles of surveying as practised by modern engineers.

The pyramids were constructed of red granite from quarries at Assouan, and other points of the Nile, and of a hard limestone from quarries at Makotam and Tourah. The blocks were very large, and it must have required a vast amount of mechanical power and engineering skill to quarry them and move them to the places where they are now found. Many engineers think that the Egyptians must have possessed some mechanical power which has been lost and become unknown to the people of the present century. Especially is this the case with the huge stones at the top of the pyramids, where the number of persons who could work must have been very small for want of room. Other engineers say that the ordinary derrick on a large scale would have been sufficient for the purpose, and it is pretty certain that this instrument was used, as holes have been found in the stones, where it is supposed the feet of the derricks were placed. Others think that the blocks were moved by human power, of which the kings had an unlimited quantity at their command. One

theory is, that as fast as the courses of stone in a pyramid were laid, the earth was piled around it so as to form an incline, where the blocks could be slowly rolled. When the last course, at the top, was laid, the pyramid would have the appearance of a hill with gradually sloping sides. The earth could then be removed, and when it was all carried away the pyramid would stand as it was intended to stand. It is true that this mode of work would require an immense force of men; but what did the kings of Egypt care for the toil of their subjects? The kings owned the land and the people, and could do as they pleased with either.

The pyramid of Cheops, known as the Great Pyramid, was twenty years in building, and it is said by Herodotus to have required the labor of a hundred thousand men during that time. Cheops stopped all other works connected with religious rites until the pyramid was completed. To facilitate the transportation of stone from the Tourah quarries, a causeway was built three thousand feet long, sixty feet wide, and fifty feet high, which is said to have required ten years for its completion. A railway engineer of the present day would have finished this causeway in a month, provided he could have the unlimited supply of laborers possessed by the Egyptian kings.

The Great Pyramid covers an area of between twelve and thirteen acres; the side of its square measures seven hundred and forty-six feet, and its height is four hundred and fifty feet. It was originally seven hundred and sixty feet square and four hundred and eighty feet high; its outer portions have been removed to furnish stone for building purposes in Cairo. Originally, it was a perfect pyramid; the builders began at the top and filled in, with small stone and cement, the angles formed by the recession of each layer beyond the one below it. Each side was thus left with an even surface sloping at an angle of 51° 50′. The outer casing being removed has left the courses of stone in the form of steps nearly four feet high, so that the ascent is not an easy one. There are always plenty of Arabs hanging around the pyramid ready to

[illegible] a traveller who wishes to ascend to the summit. By pulling and pushing him over the steps, they get him up at a reasonably rapid rate: but the exercise is of such a nature, that it frequently leaves him feeling very much as if he had been passed through a patent clothes wringer.

The pyramid contains about eighty-two millions of cubic feet of masonry, and the total weight of the stone used in its construction is estimated at more than six million tons. The entrance is on the north face, fifty feet above the base, and about twenty-four feet from the central line. The passage-way is low and narrow, and extends, in a downward slope of thirty-six degrees, three hundred and twenty feet to the sepulchral chamber. The chamber is forty-six feet long, twenty-seven feet wide, and eleven feet high. There is a branch passage-way leading from the main one, which terminates in a smaller room, called the Queen's Chamber; it is supposed that this room was intended for the resting-place of the queen's body, but it contains no sarcophagus.

In the apartment known as the King's Chamber, the walls and roof are of a highly polished granite, in slabs of great size. The only article of furniture in it is a sarcophagus of red granite, seven and a half feet long, three feet wide, and nearly four feet high. It is too large to be moved through the passage, and must have been placed in the room before the roof was covered. It is supposed that it contained a wooden coffin with the mummy of the king, and that these were taken away when the pyramid was first opened and plundered. In the construction of the pyramids, arrangements were made for closing the passages with blocks of granite, which have greatly retarded all attempts at exploration. It is supposed that there are other apartments yet undiscovered in the Great Pyramid: and at some future day an enterprising and patient explorer may be rewarded with important revelations.

Nearly a thousand years ago, the Great Pyramid was visited, and plundered, and the work of destruction has been renewed at various intervals since that time. But notwithstanding the centuries that have passed since the first visit, new apart-

ments and passages have been discovered within the past thirty years, and several important facts in the history of the pyramids have been obtained from the hieroglyphics on the stones of the interior. Another pyramid near the great one was explored in 1837; a sarcophagus was found, and with it was a mummy case of King Menkuré, but the mummy was gone where the woodbine twineth, or somewhere else. Near the pyramids there is a great number of tombs, some built above the surface, and some excavated in the rock.

The Arabs have opened nearly all the tombs and plundered them of their contents. They have no respect for dead Egyptians, and whenever they find the entrance to a tomb beneath the sands that have been blown from the desert, they quickly open the receptacle and search it for articles of value. The Egyptians used to embalm the bodies of their dead with the greatest care. Professors of the art of embalming were numerous; and judging by the extent of their work, they must have been in constant practice. The first step in the Egyptian method was to put the body in a sort of spicy pickle, where it was kept for two or three months. The viscera and all internal organs were removed to give a better chance to the pickle; and when the work was sufficiently advanced, the body was dried, filled with preserving gums and spices, and properly bandaged. The bandaging of a mummy was one of the fine arts, and sometimes a hundred yards of cloth would be required for a single subject. Every toe and finger had its separate bandage, and the preserving articles were so soaked into the bandages and plastered over them, that there was sometimes more gum and bandage than body.

A close-fitting case or coffin was put outside the mummy, and he was then ready to be packed away for any number of centuries. He kept well, for the work was thoroughly done; and mummies are constantly found in good preservation after a rest of four or five thousand years. The Arabs rob the tombs, and break up the mummies for the gold and silver which were concealed about them; and many a mummy has

grief in consequence of attempting to take his money th him. After the mummy is broken up he makes d fuel; the Arabs occasionally burn him; and in the s of the Cairo and Suez Railway, the firemen on the ves found that mummies, cut into proper lengths, made d substitute for wood and coal. The gums and rags erved the mummy are combustible, and thus facilitate ruction. Arabs and railway stokers are, like the respecters of persons, especially if the persons have d forty or fifty centuries. It amuses and benefits dern Vandals to burn mummies, and it is proper to the mummies don't appear to mind it.

ul terranean tombs and other excavations on the Nile rous, and sometimes of great extent. Several of them rge, that travellers who ventured into them without guides have been lost, and have perished for want of d light. A modern visitor says that after going through tombs, he felt very much as if he had been rolled in an ill. The passages leading into the tombs are long and sometimes they extend hundreds of feet in an indefi- rt of way, and not by a straight course, as a respectable ught to have its entrance. A slender man can get along more easily than a fat one; the latter gets stuck some- and can easily fancy himself a number ten gun-wad into a number eight barrel. An acquaintance of mine owed that not for the whole of Egypt would he ven- to a tomb again, and that he had done with explorations. k him about the tomb of Assasseef at Thebes," said a l acquaintance, who was sitting between us. We were ys at Rome, and whiling away an evening after a visit Coliseum, and the ruins in its vicinity.

ng Thebes and all it contains," was the curt reply. if you insist upon it, you shall have it on condition u won't speak of it again."

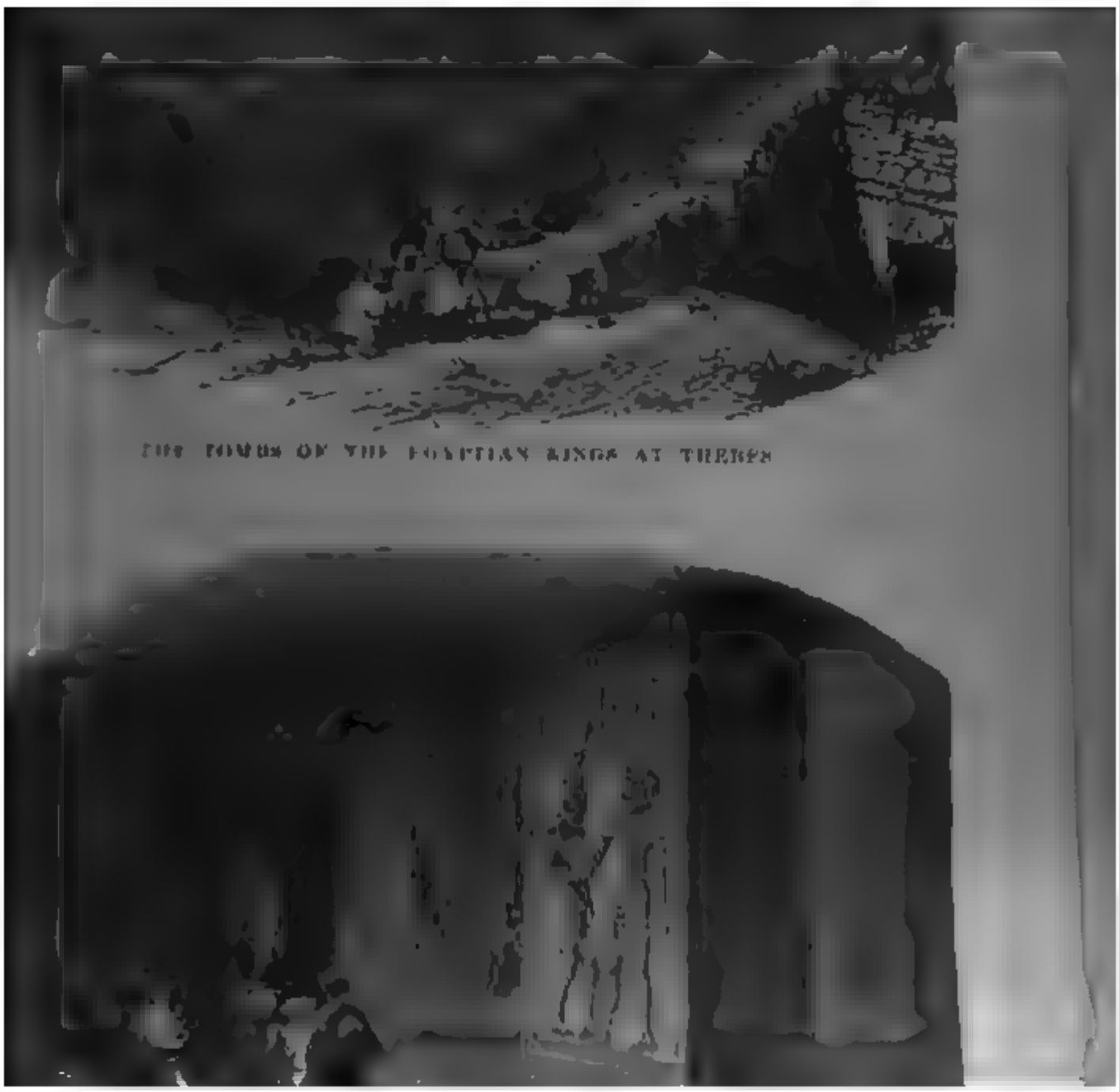
made the required promise; and after taking an extra brandy and water, he began.

re were two of us, and we were making the journey

of the Nile in a dahabieh. You know what beastly things those dahabiehs are generally, though sometimes you find one that is quite comfortable. Why the beggarly Egyptians don't call them boats, and be done with it, I never could understand. We landed at Luxor; and after looking at the ruins there, we rode to the tombs of the kings, seven or eight miles away. They mounted me on a donkey so small, that my feet dragged on the ground, and I had to take a reef in my legs to keep from wearing away my boot soles. Jack, my companion, said, that if I wore spurs, I would have to buckle them on just below my knee, as I could not raise my heels without having them so far aft, that they would not reach the animal. There was no necessity for spurs, as we had a boy to run astern of the donkey, and give him an occasional turn in the tail to help him along. The boy kept a firm hold of the tail most of the time, and was helped along by it more than the donkey was. At one time, when we were on the edge of a little ridge, the donkey watched his chance, and let his heels fly into the stomach of the urchin. A prize-fighter couldn't have made a better blow. The boy went rolling down the ridge, and I thought we should have to pay for him, or buy a new one.

"He scrambled up again, and wasn't hurt at all. Evidently he was used to that sort of thing, but I don't believe he liked it, for he made some remarks that sounded very much like swearing. I gave him half a franc, and he appeared satisfied, and ready to be kicked again. He went around behind the donkey, and got into position; but the beast wouldn't respond for an encore, and so the thing was dropped. But you can believe the boy gave that tail fits for the rest of the ride; and by the time we were through, it looked like a piece of old rope with half the strands gone.

"Jack was poetic, and began to blow and recite verses; but I couldn't think of anything except Old Hundred, and the Last Rose of Summer. They wouldn't do for the occasion, and so I amused myself with looking around at the sand and rubbish, and wondering why people came there to see



THE TOMBS OF THE EGYPTIAN KINGS AT THEBES

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Thebes must have been a nice sort of a city, but it is
nch out of repair now. It is very good as a ruin, but
't be worth much for anything else. All around us
ere the remains of temples and palaces that must have
great deal of money when they were built. Our guide
lking about tombs and other cheerful subjects, and by
he took us to the tomb of Assasseef. I didn't care
about going in, as it was nothing but a hole in the
, anyhow. Jack insisted, and so we tried it.
ssseef wasn't a king, but only a wealthy old priest, who
de money by speculation in stocks or some other way,
ded to make a permanent investment. So he went
tomb business, and built a very comfortable one, and
than any of his neighbors. It has an outer court a
feet long, and two thirds wide, and the underground
es run nearly a thousand feet into the mountain. It
well enough as long as we were above ground, but
we went below it wasn't so comfortable. The walls
black and dirty; the passages were narrow and dusty,
sometimes they were so low that we had to crawl. The
had a pre-emption claim to the place, and didn't like to be
rbed They flapped their wings in our faces, and flew
nd in a way that wasn't pleasant. Jack opened his mouth
to spout a verse of poetry, and got a number three bat
ween his teeth before he finished the first line. I used to
him about it afterwards, and he threatened to bat *me* in
mouth if I didn't stop.
There were so many bats that the noise they made in the
y vaults and passages seemed like distant thunder, and
gan to think the mountain would tumble in. The guide
ahead; and whenever we began to talk of giving it up,
ould tell about some wonderful thing a little farther on.
A good many of the passages were so low and narrow that I
to be pulled in and out by the heels, and it didn't take long
ngust me. I was as dusty as if I had made the campaign
rginia without being brushed, and the dust I had picked
sn't of the best kind either. It consisted of pulverized

mummy and other relics of ancient Egypt; and I think I should have made a very good show-piece if I had come home in just the condition in which I emerged from that tomb.

"The joke kept growing worse, till they got me in a place where I had to expel all my breath to crawl through. We got into a sort of room where an Egyptian named something or other had spent thirty-five or forty centuries of his mummy existence; but the place was about as attractive as a bath tub. The mummy had gone, and taken his baggage with him, all but the bats, which kept flying around and making themselves uncomfortable. But when we went to get out, the job was serious. The passage-way, as we came into this tomb, was a descending one, and I got into it by going stern foremost, as a ship drops down a current to pick up a new anchoring spot. But in going out I had to climb up, and that wasn't so easy. The space wasn't large enough for a man of my size to crawl well, as you have to raise your body a little every time you push yourself forward with your hands. For the same reason I couldn't get a purchase with my feet, and I hadn't gone five yards before I stopped. The guide and one of our water-carriers were ahead, while Jack was behind me, and had an Arab to bring up the rear. I yelled out that I couldn't get farther, and the train came to a stop.

"I was frightened, and that made me swell up like your finger when you have a ring on that is a size or so too small. I filled that passage-way as a cork fills the neck of a bottle, and I couldn't stir any more than if I had been anchored. The guide got hold of my arms and pulled, but he couldn't do anything, especially as the place wasn't adapted to towing purposes. What was to be done I couldn't tell; and I began to think I should have to stay there, and be converted into a mummy for the amusement of future visitors.

"Jack and the Arab finally pulled me back by the heels, and the Arab went for a rope. When he brought it we arranged for a new departure. They wanted to put the rope around my neck and pull me along; but I objected to this, as it might result in stretching my neck a little longer than I wanted

it. I looped the thing around me just below the arms, and then the guide and the water-carrier went ahead, and towed me along. It was no easy work, but they got me out at last into the larger passages, where I could get along comparatively easy. The guide said something about a fine tomb farther in the mountain, but I had had all the tombs I wanted for that day, and made as straight a course as I could for the outside. And you don't catch me in a tomb of that sort again if you give me all the kings in Egypt.

"When we got outside, we found a crowd of Arabs with fragments of mummy for sale. They had legs, and arms, and heads in abundance, but the market was rather too high to suit me. In fact I didn't want any mummy, and told the guide to set the fellows adrift. Jack bought a dried arm, and took it back to the boat, but I believe he threw it overboard a few days later. After that adventure, I visited a good many ruins, but only went where I had daylight to guide me. Whenever they told me of a beautiful tomb, and the wonders that it contained, I admitted that it must be very nice, and took everything they said in good faith. I was willing to see the tombs by proxy; and when Jack went inside, I staid where I could look at the Arabs, and study the columns of the ruined temples."

XIX.

EXPERIENCES IN WILD LIFE.

NECESSITIES OF TRAVELLERS IN WILD COUNTRIES. — CONCEALING DOG FOOD. — DEFENCES AGAINST WILD ANIMALS. — HONESTY OF CERTAIN NATIVES. — THE AUTHOR'S EXPERIENCE WITH SIBERIAN KORAKS. — CONCEALING FOOD IN ICEBERGS. — BARON WRANGELL AND DR. KANE. — STORY OF BLANKETS AND BLANKET STRAPS. — A CACHE. — WHAT IT IS. — AUTHOR'S FIRST ACQUAINTANCE WITH ONE. — A FRAUDULENT GRAVE. — CACHE OF A WHISKEY KEG, AND HOW IT WAS MADE. — "TWO-BOTTLE CAMP." — CONSOLATION OF A HARD DRINKER. — AN EXTENSIVE CACHE. — HOW THE INDIANS FOUND IT, AND WHAT BECAME OF THEM. — JIM FOSTER AND HIS TENDER HEART.

In all sparsely settled or wild countries, travellers when on journeys are frequently obliged to carry provisions for their entire trip. If they are to go back over the same route they follow in their outward course, they do not carry their provisions the whole distance, but leave them at different points, where they can find them on their return. Especially is this the case where food for the draught or riding animals must be provided. In Northern America and Asia, and in Greenland, Spitzbergen, and other arctic countries, dogs are used for draught purposes; and where a party is travelling it is always necessary to carry a supply of dog food. The favorite article for feeding dogs in winter is dried fish, and great quantities are prepared in the summer months, and stored away where they can be safely kept.

An expedition starting in winter for a journey of ten days will carry ten days' supply of food for dogs and men. If the journey exceeds that time, the allowance must be reduced; and sometimes the party will be on the point of starvation. At the end of each day's journey, it is customary, if the party is to return by the same route, to conceal a day's supply of food, and thus lighten the load as much as possible. There

ral ways of making these deposits. The first requisite
ally to protect the food against wild animals. Poles
ten feet high are set upright, and a rude box is made
p, where the food can be placed. Wolves and foxes
principal four-footed thieves, they cannot climb and
anything protected in this way is safe from their
ws. Sometimes a hole is made in the ground, and
at is placed within it This can only be safely done
r, as the soft earth in summer can be dug up by the
ing and keen-scented animals with very little trouble.
winter can be made secure by pouring water over
hard earth, and allowing it to freeze. Wolves and
n do many things, but they have not yet invented any
dig through frozen ground. They are wise enough
ttempt it, as they would need a new set of paws every
ar if they followed digging in frozen earth as a means
ihood
n Wrangell, Dr. Kane, and other arctic explorers, when
ing on the ice of the Polar Sea, used to make holes in
ergs and hummocks, and sometimes in the level ice,
frequently gets a thickness of eight or ten feet. After
had made the deposit in a hole of this sort, they would
lock of ice as nearly as possible to the opening. After
ing the block they poured water into the interstices,
llowed it to freeze, so as to make the place as solid and
as ever. This was a sufficient protection against small
ls, but not always against polar bears. These huge
s would scent out the food, and with their powerful claws
managed to dig into the ice, and help themselves. Even
food had been put into strong boxes before it was
fted, the beasts did not seem to be hindered in getting
as they would break the boxes as easily as a rat would
an egg-shell. Dr. Kane once tried the plan of sealing
od in sheet iron cans pointed at the ends. Sometimes
ears tossed these cans a while, and then abandoned them;
they generally managed to throw them about with
ient violence to break the shell and reach the contents.

A healthy and full-grown polar bear is a powerful beast, and has no respect for the laws affecting the ownership of property.

In the extreme north deposits of food are in much greater danger from four-footed beasts than from men. In the first place, the beasts are much more numerous than men, and consequently want more to eat. Men are not very likely, in those wild countries, to come near the deposits, especially in arctic explorations; and even when they find them they are not generally in the habit of stealing. The Esquimaux of the region where Dr. Kane made his explorations are somewhat thievish when they have the opportunity, but the natives of Northern Asia have a high reputation for honesty. There are some tribes that have never learned to steal; they have had very little intercourse with white men, and are thoroughly uncivilized. As an illustration of this barbarous honesty, I will give my own experience among the Koraks of North-eastern Siberia.

My first acquaintance with them was on the shores of the Okhotsk Sea, where they had assembled with their herds of reindeer. When we went ashore we managed somehow to wet our blankets, and I hung mine up to dry. I expressed my fears that the blankets would be stolen by some of the Koraks, but was told that everything would be safe. When we camped at night, my blankets were dry, and I slept in them. But I forgot the blanket-straps, and there they hung in the open air all night, and all the next day.

Now, it is a moral or an immoral certainty that a pair of leather straps, new, and in good condition, in almost any other country would have been taken in hand by somebody who couldn't bear to see them unused. But when I finally thought of my straps, I found them hanging where I had left them thirty hours before, in full view of a dozen or more natives, who were dressed in skins, and didn't know anything more about civilization and the customs of fashionable society than a horse knows about running a sewing-machine.

On our western plains the custom of concealing articles in

ground prevails over any other mode. The Indians have practised it, and they manage it so skilfully that it is yet to impossible to detect them. The early French settlers and explorers learned the practice from the Indians, and the name they gave to a place of concealment — "*cache*," from the verb, to conceal — has been adopted into the language of all trappers, of whatever nationality. So well is this word known that many frontier Americans use it in preference to words in their own language having the same meaning. A frontiersman will speak of finding a place where a squirrel had *cached* a stock of nuts, or will tell you that he *cached* his bowie knife in his boot-leg rather than carry it at his waistbelt.

My first acquaintance with a cache on the plains was in the vicinity of Fort Kearney. Our party was camped near half a dozen men who were returning from Salt Lake City, and had lost three of their oxen. We struck up an acquaintance, and in the evening invited them to sit around our fire, where we exchanged news and stories, they telling us of Utah, and we telling them about the States or "God's Country," as one of them called it. "Stranger," said he, "if ever I get back to God's Country, and you catch me again on these yere plains, you may just shoot me for a prairie dog. I've seen all I want of this yere living, and don't hanker for no more of it. I'm a going back where I can have a square meal at a table, and drink whiskey that wouldn't burn a hole through an old boot in five minutes."

We were not bountifully supplied with the necessaries of life, but we felt liberal, and ventured to offer a drink of whiskey to each of the strangers. They took it as unhesitatingly as a kitten would take a saucer of new milk, and we became friends in a short time. When we separated, one of the eastward-bound travellers said, —

"May be you'll run short of flour before you get to the mountains, and a little would help you along. Now, we had to lighten up just this side of the Platte crossing, where we lost two of our oxen. We couldn't find anybody to sell to, and as we didn't like to throw things away altogether, we

cached some of them. Next day we met a man one of us knew, and we sold him all the caches but one, and told him where to find them. But there was one bag of flour in a cache away from the rest, and he didn't want no flour; so we didn't tell him where it was."

We offered to buy the flour, but the men would not listen to the proposition.

"It's Utah flour," said one of them, "and isn't very good. The sack is small, and the whole lot wouldn't be worth a great deal; but you can't buy it. You've treated us handsome, and we're not going to be rattlesnakes. We want you to take that flour, and you shan't pay for it."

We thanked them heartily, and proffered another drink, which was accepted and swallowed.

"About five miles this side of the old crossing of the Platte," one of the strangers continued, after wiping the drops of whiskey from his lips, "you will come to a dry creek. There's a small clump of willows on your right hand, and mighty small willows they are too; and on the left side, a dozen yards off the road, there are three buffalo heads piled up, with a sage bush sticking in the top one. Now, you go up the creek past these yere buffalo heads about fifty yards, and you'll see a grave with a little board at one end. On the board are some words which we cut, that says, 'J. MEANS, SALT LAKE, 34 YEARS.' Now, there ain't no J. Means there, but there is a sack of flour, and you'll find it by digging."

We made a memorandum of the direction, and soon after retired to sleep. In the morning we broke camp, and continued our journey, keeping the cache constantly in mind. When we reached the spot indicated, we opened the grave, and found the sack of flour, as our friends of a night had told us we should find it. The soil where it lay was quite dry, and the flour might have been left there for months without serious injury, beyond growing a little musty.

A grave is regarded with respect by nearly all white men and by most savages. Consequently a cache is frequently made in the form of a grave. A head-board bearing the

is a cache, containing something else than the remains
ckless traveller.

journey from Denver to New Mexico, in the autumn
0, our party contained one man whose appetite for
y was of the keenest and most insatiable. In making
outfit, we had left a portion of the purchases to him,
had bought about six times as much fire-water as we
eeded. On the first and second day he managed to get us
as a Tammany repeater at election time, and was neither
ental nor useful. On the second night, while he was
g, and possibly dreaming of a paradise where there
rivers of pure Bourbon, and no charge to bathers and
s, we arranged a plan to bring him to grief. We took
of whiskey from our wagon, and cached it a little way
amp. We threw the dirt into the creek, and built a
er the place of concealment, so that there was no trace
at we had done. In the morning we kept him away
e wagon until we were several miles on the road, and
hed a bottle at his command he did not discover the
til night.

when he did discover it, there was trouble in the
We dared not tell the truth, for fear he would insist
returning to recover the treasure. So we feigned igno-

To console himself, he went into a condition of blind dru enness, and remained in it till morning. At this camp cached a couple of bottles of whiskey, and then solem averred, next morning, that he had swallowed them. all his denials we were incredulous, and we narrated, w great minuteness, how he drank one bottle after anoth filling a pint cup at a time, and draining it at a gulp. finally began to believe that we were right, and for the r of the journey he kept comparatively sober.

On our return, two weeks later, we had a long day's journ before us to reach "Two-Bottle Camp," as we had named In the morning we made a general confession to the fellow, and owned up to the theft and concealment of bottles. His rage at the deception practised upon him v great, but it was not equal to his joy at knowing there v happiness ahead. Never on the whole journey did he ex himself more than on that day to keep the wagon in moti and enable us to reach the whiskey-hunting ground by s set. To him the camp of the Two Bottles was like a harl for which the storm-tossed mariner hopes and prays when gale is upon him, and his ship is lying at the mercy of wind; and as soon as we reached it, he made a rapid br for the cache, and opened it before the wagon was fai halted.

He forgave us everything, and for that evening we ha millennium on a small scale. We compelled him to retain bottle for the festivities of the next evening, as we wan him to go to town sober, and consequently determined to hume the keg, and put it in the wagon without his knowled Everything was lovely; the keg was secured, and when reached Denver, we pretended to discover it in the of whence we had started.

In the days of the great emigration overland in 1849 '50, the emigrants frequently found their wagons too hea burdened, and were obliged to throw away or cache a la part of their loads. When they cached their goods, the dians generally found them, as the work was almost alw

done carelessly and in haste, so that traces of it could be plainly seen. One old plainsman once described to me a cache which was made by a party to which he belonged.

"We found," said he, "that we must lighten up our wagons: so we concluded to stop a day or two, make a cache, and give our animals a chance to rest. We were near the Wind River Mountains, and Indians were not abundant. We had seen none for several days, and thought we could rely upon doing our work without their seeing us. We were in camp when we decided to make the cache and at daylight next morning two of us started out to find a good place.

"About three miles off the trail we found a bluff that was quite steep towards a small river that we named Lost Ox River, because one of our oxen afterwards got into the quicksand and was drowned. We thought this bluff would be a good place for a cache, as we could throw the dirt into the river and have it washed away. The bluff was hard and dry, and would keep things from spoiling.

"We drove the train into the valley, at the foot of the bluff, and then went to work. We made a hole about three feet square and as many deep, and then we hollowed out a space as large as a good-sized room. We did not drop an ounce of dirt around the opening, but threw it all into the river. We spread blankets and sacks all around the opening, and laid a row of them from the hole to our camp, so that the ground wouldn't be trodden up.

"Then we lightened our wagons of everything we could spare. There were bundles of goods, extra clothing, saddles, chains, boots, and everything we thought it possible to do without. When the hole was full, we put the stump of a tree into the opening, and scattered leaves and rubbish around it, so that nobody could possibly see that the earth had ever been disturbed.

"It took us three days to make the cache. Our mules and oxen had gathered strength, and we moved on, with a good prospect of getting through to California.

"But things grew worse instead of better. When we got

into the alkali plains our oxen died off fast, and we had to throw away something every day. With so much bad luck it was quite natural that we should get into rows among ourselves, and the upshot of it was, that we separated. Some of us were discouraged, and wanted to go back; and we did go back.

"Four of us took our rifles, and each picked out a riding mule to carry us to the Missouri River. We had two pack mules, and thought we could somehow manage to get through. We had a hard time of it, stranger, and didn't get farther than Laramie, where we broke up, and concluded to try our luck at anything that turned up.

"When we got to where we left the trail to make our cache, I told the boys we had better go and see if it was all right. Three of us went there, and left the other to take care of the animals.

"Somehow the Indians had found out the whole thing. We don't know how they did it, but it was most likely that the wolves and foxes went to digging there for the leather in the boots and saddles, and the Indians saw where they dug, and knew something was hid. All around there were tracks of Indians, and they had taken out more than half of what we had put there.

"While we were talking about the business, and cursing the red skins, we saw five of them coming up the valley. There were four bucks and one squaw, and they hadn't seen us. So we just laid low and waited for them. They stopped at the foot of the bluff, and the bucks made for the hole, leaving the squaw to take care of their ponies and keep watch.

"The squaw sat down, with her back against a tree, about fifty feet from where we were. She was evidently tired, for she dropped her head forward, and didn't keep much of a watch. Jim Foster, one of the fellows with me, was an old Indian hunter, and knew how to work. He crept up behind her, slipped the belt from his waist, and before she knew what she was about, he had the belt around her neck, and fastened her to the tree. As soon as he had her fast, the other fellow

and I ran to the cache, picked up the stump that had been in the hole originally, and put it where it belonged. Then we piled logs and rubbish on top, and stopped up the crevices, and waited a couple of hours, until we thought they had breathed all the air up and were good Indians.'

"'What do you mean by good Indians?' I asked.

"'Why, don't you know,' said he, 'that all good Indians are dead Indians.'"

I saw the point, and after he had terminated the smile with which his axiom was delivered, he went on with the story.

"'We made sure that they would never do any more stealing. We didn't want to kill them, of course, but we thought it would be no more than right to cache them along with the property that was left. There never was a better use made of an Indian than to cache him. As soon as we were satisfied that they couldn't get out, we took the ponies and went to where our fourth man was waiting with the mules. We distributed our loads on the mules, took the ponies to ride on, and you may believe that we travelled our level best out of that region."

"And the squaw," I asked; "did she go with you?"

"O I forgot about her. Jim was a careless sort of a fellow, and he pulled that strap so close around her neck that she never recovered. Come to think of it, she didn't live long, not more than five minutes, and Jim was very sorry. He said he would do the best he could for her, and seeing she was dead, he wouldn't refuse to bury her. So he carried her to the river, where there was a good bed of quicksand, and dropped her in. She sunk easy, and I reckon she's somewhere about there now. She had a lot of silver ornaments about her, and Jim felt so bad that he kept them to remember her by. He said it would be a shame to waste them, as silver was scarce in that country. He wanted to go back, and see if the bucks had something valuable about them; but I thought we had done a fair morning's work in hiving the ponies, and it was best to be getting away from there before any more Indians came around. And we up and travelled lively."

XX.

THE GREEN VAULTS OF DRESDEN.

THE RICHEST TREASURY IN THE WORLD. — HOW THE SAXON PRINCES ACQUIRED IT. — THE DIFFERENT CABINETS, AND WHAT THEY CONTAIN. — WONDERUL CARVINGS, MOSAICS, AND CURIOSITIES. — SPLENDID GOLD AND SILVER PLATE. — MAGNIFICENT ROYAL REGALIA. — A LUXURIOUS AND GALLANT MONARCH. — HIS ROMANTIC ADVENTURES. — A MARVELLOUS TOY. — DAZZLING EMERALDS, PEARLS, RUBIES, AND DIAMONDS. — THE LARGEST AND MOST PRECIOUS GEMS ON THE GLOBE. — INGENIOUS AND DESPERATE ATTEMPTS TO ROB THE VAULTS. — A THIEF WALLED UP ALIVE. — EFFECT OF EXPOSING HIS SKELETON. — ARE THE PRICELESS JEWELS FALSE? — WHAT AN ENTERPRISING SCOUNDREL MIGHT ACCOMPLISH.

THE Green Vaults (*Grüne Gewölbe*) of Dresden, as they are called from the hue of the hangings which once covered them, are in the Zwinger, a group of buildings erected by Augustus II. as a vestibule to a new palace. They are not under ground as might be supposed from their name, and from the fact that they contain the treasures of the King of Saxony. They are vaulted apartments, eight in number, stored with rare carving, mosaics, gold and silver plate, precious stones, and an endless variety of curious and invaluable articles.

The collection is the richest possessed by any European monarch, and altogether beyond what so small a power would be thought able to collect or keep. The Saxon princes, it must be remembered, however, were of far more consequence and influence in the past than they are in the present. The Freiberg silver mines alone were a source of immense revenue before the discovery of America, and Saxony had various means of acquiring wealth of which she is now wholly deprived.

I have examined nearly all the royal treasuries abroad, and none of them are at all equal to the collection in Dresden,

which is likely to create an agreeable surprise even after one has heard its variety and value extolled. I have known political economists to regret that what might be converted into so much money should be allowed to lie idle, and I have met others, again, who regarded the treasures of art and the priceless jewels gathered there as so many baubles unworthy of serious consideration. Persons of cultivated taste and lovers of beauty, however, can hardly be so narrow in their opinions, for they will find in the Green Vaults something more than capital uninvested, or glittering toys. The princes deserve commendation for the liberal manner in which they expended their wealth for the æsthetic benefit of those to come after them.

The apartments are so arranged that each one you enter surpasses the last in interest and the variety of its contents. A great deal of space would be required to enumerate all the articles, though the principal may be easily set down.

The first apartment is devoted to bronzes of the rarest and most curious workmanship. There are copies in miniature of some of the famous statues, that cannot be fully appreciated without close attention to detail and a liberal understanding of art. A crucifix by John of Bologna, and a small dog, stretching itself, by Peter Visscher, are masterpieces of their kind.

In the second apartment are ivory carvings of remarkable excellence; among them a number of beautiful vases, some quite large, cut out of a single piece. There are, also, a battle scene by Albrecht Durer, a crucifix by Michael Angelo, and a marvellous group of some ninety figures carved in one piece sixteen inches high, representing the fall of Lucifer and his wicked angels. Nothing could be finer or more exact than these figures. Small as they are, they are perfect, and plainly show what extraordinary patience and skill the artist must have had. A goblet, of stag's horn, cut like a cameo, in figures portraying the chase, is admirably wrought, as is also a cup on which the story of the Foolish Virgins is delineated.

The third apartment has Florentine mosaics, engraved shells, ostrich eggs carved and ornamented, a singular chimney-piece of Dresden china set with precious stones, paintings in enamel, and a number of portraits of historic characters, the most noticeable of which are Peter the Great and Augustus II., surnamed the Strong.

The fourth apartment is filled with the gold and silver plate formerly used at the banquets of the Saxon princes, a portion of which was wont to be carried to Frankfort on the occasion of the coronation of the German emperors by the electors of Saxony, who held the hereditary office of arch-marshal at those imposing ceremonies. Beyond the mere value, this plate is not desirable. If it were mine, I should melt it at once into the coin of the realm, since it has neither grace nor beauty of form. It may seem very grand to eat and drink out of such vessels, but they would be found extremely inconvenient for practical purposes. The china of our day is altogether superior to all the gold and silver plate that has ever been heaped on royal tables.

The fifth apartment is taken up with agates, crystals, chalcedony, lapis lazuli, and other varieties of semi-precious stones. Some cups of moss agates are particularly beautiful, and two goblets, composed entirely of cut gems, have a value of ten thousand dollars each. An equestrian statue of Charles II. of England, made from a solid piece of cast iron, represents him in the character of St. George, and is skilfully done. The eminent sculptor, Colin of Mechlin, has shown the cunning of his art by two spirited combats of knights, though they are only wooden heads; wood being the material of which the carvings are made. The largest enamel painting known, a Magdalen by Dinglinger, is also shown there.

The sixth apartment abounds in figures carved in ivory and wood, many of them caricatures of men and animals, which express the grotesqueness of the German mind. Single pearls of extraordinary size, nearly all found in the River Elster, are cut into odd shapes, some of them representing rustics, jesters, and elves. A pearl, large as a hen's egg, is

intended to portray a Spanish court dwarf, and is superbly done. Trinket as it is, it could not be purchased for twenty-five thousand dollars. There is, besides, any number of costly trifles, on which a vast deal of ingenuity and money must have been expended, and which are interesting from their artistic merit.

The seventh apartment is radiant with the splendid regalia used at the coronation of Augustus II.

Augustus is inseparably associated with the history of Saxony, and the antecedents of Dresden. He succeeded his father, John George III., as Elector of Saxony, though not until after his elder brother's death, in 1694, and was elected to the throne of Poland, made vacant, two years later, by the decease of John Sobieski. The Polish nobles were unwilling to be ruled over by anybody but a Roman Catholic, and Augustus, whose theology was of a very accommodating quality, abandoned Protestantism for the sake of the crown.

Between his wars, his intrigues, and his parades, his sixty-three years of life were superlatively busy. He was highly educated for his time, and so much interested in art that he began the collection of pictures in the Dresden Gallery, and purchased many of the valuable curiosities now in the Green Vaults. His reign was marked by luxury and splendor, and his court was the constant resort of artists, alchemists, and adventurers of both sexes, on whom he lavished countless favors. The celebrated Countess of Königsmark was one of his many mistresses, and bore him a son, who subsequently figured so prominently in French history as Maurice, Count de Saxe.

Augustus was such a prodigal that he loaded Saxony with debt, and inspired the magnates of Poland to imitate his improvident example in Warsaw. Elegant, accomplished, daring, and unscrupulous, he made war on men and love to women to the end of his days. If all the accounts be true, he was as charming as Apollo and as strong as Hercules. The archives of Dresden attest his wonderful muscle to such a

degree that Samson would have been no match for him. One of his pastimes was to become enamoured of some distinguished lady he had never seen; go in search of her; throw her husband, father, or brother, just as it happened, over high walls, and then carry her off in his arms as if she had been a feather weight.

These tales are interesting, but there are too many of them to be credible. I cannot tell how large the Saxon or Polish women were a century and a half ago, but I will lay a large wager that Augustus could not carry very far many of them I have seen recently. If he had the taste ascribed to him, I am sure he would not make the attempt, unless it should happen to be in the night, when darkness reduces beauties and beldames to the same level.

Persons going to Dresden, or indeed to any part of Saxony, will spare themselves questions by presuming that Augustus has done nearly everything worth doing in the entire kingdom. He is to Saxony what St. Patrick is to the south of Ireland, King David to Scotland, or Charles V. to Belgium.

The eighth and last apartment entirely eclipses all the others in the richness and magnificence of its contents. One of the wonders of this cabinet, called the Court of the Great Mogul, was made by Dinglinger, an artist justly considered the Benvenuto Cellini of Saxony. The Court represents the Emperor Aurengzebe on his throne, surrounded by courtiers and soldiers, — about one hundred and forty figures, — in pure gold enamelled, attired in costumes appropriate to the country and the time. Each figure has its individual expression and character, as will be perceived by close observation.

This marvellous toy, which is really a work of the highest art, employed Dinglinger (he was the court jeweller during the early part of the eighteenth century) for nearly ten years, and cost one hundred thousand dollars. Another carving of a similar character portrays different artisans with a fineness and finish which no one would expect, considering its diminutive proportions. There are also other specimens of *his*

exceeding skill that fully entitle him to the fame he has achieved.

A specimen of uncut Peruvian emeralds, bestowed by the emperor Charles V. on the Elector of Saxony, is one of the best in the world, and a mass of solid native silver from the Himmelfürst mine of Freiberg so well illustrates its richness as to enable me to believe that in fifty years nearly twenty-two hundred tons of silver were obtained from that single mine.

The Saxon regalia there exhibited includes the sword of the elector, carried by the princes at the imperial coronations, the decorations of a miner's uniform made for the Elector John George; a great number of chains, collars, and orders of the Garter, Golden Fleece, and Polish Eagle; and a curious antique portrait (a cameo of onyx) of Augustus the Strong. A sardonyx six and a half inches long, and four and a half broad, reputed to be the largest extant, attracts much attention from its oval shape and beautiful regularity.

Two rings once worn by Martin Luther appeal not a little to earnest Protestants. One of these, an enamelled seal ring cut with a death's head, and the motto "*Mori sæpe cogita*" (Reflect often on death), is sufficiently mournful in suggestion to satisfy the most dismal of theologians. The other ring is a carnelian bearing a rose, and in its centre a cross.

Then comes a glass case of the rarest and costliest jewels, the first division containing superb sapphires, the largest of them uncut, the gift of Peter the Great. The second division is full of splendid emeralds; the third of magnificent rubies (the two largest weighing forty-eight and sixty carats); the fourth abounding in beautiful pearls, one native set being little inferior to the Oriental; while the fifth division is radiant with diamonds.

Such another collection does not exist anywhere in the world. If these diamonds were sold for the sum they would very readily bring, they would more than pay off, it is said, the

entire national debt of Saxony. The diamond decorations for the gala dress of the elector consists of buttons, collar, sword and scabbard, all incrusted with the largest and most valuable stones, some of them weighing fifty carats each. The most remarkable of the stones is a green brilliant, weighing one hundred and sixty carats, and said to be worth two millions of dollars. There are also various orders studded with diamonds and many single gems, yellow, rose, and green in color, as well as pure white.

Admirers of diamonds can have an ocular banquet there; for the collection is magnificent beyond description. I have seen women hang over them until their eyes fairly watered (I wonder if this is the reason they are called gems of the first water), and I have noticed men regard them with a passion for possession that savored of wildness. As mere objects of beauty, they are deserving of all admiration. Those priceless gems are constant miracle-workers. The smallest ray of light that falls upon them is converted into a glorious sheen. They make the very atmosphere brilliant, emitting from every point a radiance which is dazzling. Hardly any conjuration of magic can be greater. The blaze of jewels, when the sunlight touches them, is almost overpowering. The mines of Golconda, as they were in their palmiest days, appear to be open, and all their glorious treasures to be flashing, scintillating, coruscating at once.

One might imagine that the diamonds and many of the other valuables of the Green Vaults would be in danger from the admission of strangers. The naturalness of this opinion has doubtless given rise to the story that unseen soldiers have their muskets levelled through invisible loopholes in the walls at the head or breast of everybody entering the royal treasury. This is a mere romance, never having had the smallest foundation in fact. Such precautions are not at all necessary; for nobody could steal anything, and get away with it, even if he should try. The costliest objects are covered with strong iron or steel wires, not sufficient to obstruct the view, but enough to prevent their seizure by any designing or dis-

twenty-five millions of dollars, and even as high as
ions. Most of the works of art, as well as the jewels,
ally beyond price; for they could not be repla ed,
ld not be purchased any more than the Raffaelles,
ns, and Titians, in the famous Picture Gallery in the
.

id that numerous efforts have been made during the
dred years to rob the Green Vaults.
f these was by two Poles, who had had a wide experi
forgery, burglary, and crimes of all sorts, in the early
the present century. They had at first designed to
number of confederates, but afterwards abandoned
fearing that their secret would be unsafe when so
ersons shared it. After revolving various plans in
nd, they concluded to depend upon themselves alone,
ordingly entered the vaults, pretending to be Protes-
gymen from Geneva, in company with a large party
rs, composed mostly of Englishmen and Americans.
ey had reached the last cabinet, and while one of
making particular inquiries of the custodian, and
g the attention of the party by his large fund of infor-
(he spoke English with remarkable facility), his com-
contrived to hide himself in something closely resem-
ble, the material for which he had concealed upon his

ence. A number of the visitors thought they had seen him a few minutes before; but the disguised Pole was so positive in his declaration, that they naturally fancied themselves mistaken.

The party at last went out, and late that night the concealed villain, who was prepared with matches and a dark lantern, crept out of his spurious bale, and, with instruments provided beforehand, got into the cases, cut the wires, and secured many of the most precious diamonds. He then attempted to get out of the vaults, but, to his astonishment and consternation, they were too strong for him. The partner of his guilt was at his appointed post on the outside, and waited in vain until daylight for the robber who was to come forth at a stated hour with his treasures. The other Pole had secured his great wealth; but, by a strange shortsightedness not uncommon to villains of his class, he had not calculated closely enough upon the means of getting away with it. Finding that the vaults were his prison, he tried to put the jewels back in such a shape that their displacement would not be noticed, and then crept once more into his bale. The custodian entered with a number of sight-seers about noon the day following. His quick eye discovered at once that the diamonds had been tampered with, and this fact, taken in connection with the mysterious disappearance of the previous day, confirmed him in the belief that a robbery had been attempted, and that the robber must be hidden in that particular apartment. Consequently he ordered a guard, and a thorough search having been made, the thief was soon exposed. The scoundrel, knowing it would be useless to deny his design, made a full confession in respect to himself, and was tried and sentenced to prison for twenty-five years, equivalent to life, for he was at the time of his capture more than fifty-five. After serving ten years of his sentence, he made his escape by bribing, as it was supposed, some of the officials, and not long after was killed in Palermo while attempting to break into the house of an English resident of the Sicilian

1798 some twenty Viennese rogues went to Dresden
xpress purpose of robbing the Green Vaults of their
luable jewels. Their plan was to undermine the
, enter it by night, and make their egress by the
nnel. Their scheme was bold, and might have pros-
beset as it was with obstacles. Any and all re
frustrated, however, by the betrayal of the gang
of its number, tempted by the hope of a liberal re-
r his treachery. He was, it is asserted, handsomely
d the information which he furnished caused the
three of the conspirators; the rest leaving the city
, and placing themselves beyond the reach of the law.
he miscreants were sent to prison, and the third, who
tive Greek, and reported to have been for some
brigand, cheated justice by poisoning himself in his

t fifty years ago, as the story is told in Dresden, cer-
anges were made in the Green Vaults, involving the
of a new interior wall of brick. This intended addition
g become generally known, an enterprising rogue in the
nceived a plan of robbing the treasury by concealing
f in a part of the wall then unfinished; designing to get
night, after the workmen had gone away, and carry off
ver was lightest and of most value. He did succeed in
ling himself, as he had wished; but unfortunately for
he masons worked more rapidly than he had supposed
ould, and enclosed him completely. Whether he knew
time what would happen, and was afraid of revealing
sence, or whether he was totally ignorant of the peril
situation, will forever remain unknown. As may be
ed, the thief, being, like other mortals, unable to live
t air, soon succumbed to his peculiar surroundings,
his fate was a secret for years after.
improvements, then making, caused the removal of the
wall, and within it the perfect skeleton of a man was
ered. Great and exciting was the mystery at first;
igent inquiry, and vivid recalling of the date when the

work was done, solved the enigma by establishing a conne tion between the finding of the skeleton and the disappea ance of a certain notorious criminal. The skeleton of th thief was put together, and for some time occupied a conspic ous position in the vaults, as a warning to all inclined to follo his example. But it served as an example instead, as wa shown by the fact that several attempts at robbery wer made there within six months after the grim exposure. Th skeleton was then removed from the vaults, and as is pop larly supposed, has been transferred in a multiplied form t the private closets of the Dresdeners.

Not a great while ago, a story was started to the effect tha the principal diamonds in the Green Vaults had been stole by some of the officials of the .court, and replaced wit counterfeit stones. This report obtained wide currenc and was generally believed among the common people. I may be inferred that there was no basis whatever for the tal as any one who is a judge of jewels may easily determine fo himself. If it were possible to make such excellent counte feits of diamonds as are those now at Dresden, genuin gems would certainly lose much of their value, since ther would be no method of distinguishing between the real an spurious.

The contents of the Green Vaults have for generation been a source of anxiety to the Saxon princes. Again an again, during the troublous times in Germany, they hav been compelled to carry their treasures to the mountains i the region along the Elbe, known as the Saxon Switzerlan and to keep them there for security until the peril of plund had passed. This sudden transportation of the royal valuabl was very frequent during the Seven Years' War, and it is r ported that many of them were lost in the haste and excit ment attending their removal.

The Green Vaults offer a constant temptation to the rogu of the old world, and it would not be at all surprising if som man or men, possessed of a rare genius for pilfering, shou yet accomplish what has so frequently failed. Robbery an

burglary are so much a profession nowadays, and so much real talent is employed in their behalf, that those who have been graduated in the calling will be inconsiderate of their own interest if they do not some time perfect a scheme which will result in plundering the greatest and richest treasury on the globe.

A rich reward awaits any one who will enter the Green Vaults of Dresden and carry away their treasures, or so much of them as could be easily carried by one man. Possibly an American or English burglar will yet be found who can succeed in this daring enterprise.

XXI.

THE CATACOMBS OF PARIS.

THE FAIR CAPITAL UNDERMINED. — HISTORY OF THE VAST GRAVEYARD. — SIX MILLIONS OF SKELETONS. — A JOURNEY THROUGH THE CITY OF THE DEAD. — HORRIBLE SENSATIONS OF BEING LOST THERE. — GHASTLY DISPLAY OF SKULLS AND BONES. — TRAGIC AND COMIC INCIDENTS. — TERRIBLE EXPERIENCE IN THE MIGHTY CHARNEL-HOUSE. — SCENES NEVER TO BE FORGOTTEN.

FEW persons think, while strolling through the fashionable streets of Paris, and seeking pleasure in its charming precincts, that they are wandering over a vast graveyard, and that only a thin crust of earth separates them from the burial-place of six millions of human beings. Down there lie the remains of a third as many people as the entire French capital contains. A large part of the beautiful city is undermined by vaults, and these vaults, which are the famous Catacombs of Paris, contain the dead of centuries.

The Catacombs of Paris are not used, like the Catacombs of ancient Thebes, Rome, and Naples, as places of original sepulture; for they were once quarries from which the stone employed in building the city was taken. The quarries were beneath the southern part of the town, directly below the Observatory, the Luxembourg, the Odéon, the Pantheon, and many of the well-known streets, such as St. Jacques, La Harpe, Tournou, Vaugirard, and others. Their extent is estimated to be about three millions of square yards; and long before they were cemeteries, they served as refuge and shelter for thieves, incendiaries, assassins, and all the desperate criminals who for many centuries abounded in the city. It is only a little more than a hundred years since Paris has been orderly, or in any sense secure. During the middle ages, and down to

the latter half of the past century, property and life were extremely unsafe. Ruffians stalked abroad by day as well as by night, and bade defiance to law and its guardians. In those times the quarries shielded many of the greatest villains in the capital. After committing robbery, arson, or murder, they fled into those excavations, and the men whose duty it was to arrest them were afraid to follow where they would certainly have been massacred. Many are the stories told of policemen and soldiers meeting their death in the subterranean vaults at the hands of the malefactors they were pursuing. These were so familiar with all the recesses and windings of the quarries that they could not only escape, but they could lie in ambush, and fall upon the officers of the law with terrible vengeance. So numerous were the murders committed in the quarries by ruffians of the olden time, that finally none of the king's minions could be found bold enough to venture into those abodes of mystery, darkness, and crime.

In 1784 some part of the quarries was broken through from above, and as there was imminent danger of the houses in the streets falling into ruin from similar accidents, a number of the most skilful engineers were ordered by the government to descend into the quarries, make a careful investigation, and render them in future altogether secure. While so engaged, M. Lenoir, lieutenant general of the police, conceived the idea of removing to the vaults the remains that had been buried in the cemetery of the Innocents, then standing on the present site of the Halles Centrales, the principal market of the city. Other graveyards within the municipal limits needed to be emptied, and it was determined that the contents of these graves should also be transferred to the subterranean region; so, on the 7th of April, 1786, a formal consecration of the Catacombs as a place of burial took place with imposing religious rites and ceremonies. The human bones were borne from the graves at night in funeral cars, accompanied by priests decked in their sacerdotal robes, carrying torches, swinging censers, and chanting the Roman

Catholic service for the dead, and on arriving at the depository were hurled down a shaft in magnificently miscellaneous confusion. Such a democratic mixture, osseously speaking, of saints and sinners, princes and peasants, reformers and robbers, bishops and beggars, poets and pickpockets, grand ladies and grisettes, coquettes and cocottes, was never before made on the banks of the Seine. This superb disorder remains to the present day, so far as rank and caste are concerned. The skull of a pious prelate rests upon the ribs of a desperate cutthroat, and the thigh-bone of a once renowned beauty of the Faubourg St. Germain touches the grinning teeth of a vulgar conscript shot for desertion. The skeleton arms of a dainty poet are interlocked with those of a hideous hag who poisoned her father and mother in the Rue de la Croix Rouge.

If the opinion be well founded, that on the day of judgment the dead will arise in their proper persons, the unfortunates buried in the Catacombs of Paris will find it an extremely arduous task to collect themselves together. One might imagine, in such a universal resumption of long-cast-off and worn-out fleshly garments, that some nondescript individual might appear on the awful scene with the head of a marquis on the trunk of a rag-picker, borne along by the legs of a ballet dancer, and a cripple gesticulating to the angelic host with the right arm of a cardinal and the left arm of a lorette. It has long been a theological problem whether, on that solemn occasion, the dead will recognize each other; but it will be a matter of even more serious moment to them whether many of the Parisians will be able, so strangely will they be made up, to recognize themselves. That there will be a rattling among the dry bones no one who has entered the Catacombs can doubt, and that much of the rattling will arise from Monsieur Bonjour's effort to make a complete conjunction with his remains, and from Madame Beaujoli's endeavor to hunt herself up, must be plain to everybody. Some of these anticipated troubles may be partially obviated, however, by the fact that the bones from one cemetery have been kept

ing these gloomy recesses to the public more than
ually, — usually about the first of October, — when a
ns are permitted, after obtaining tickets from the
general, to accompany him in his subterranean tour.
time I visited Paris I was extremely anxious to
through the Catacombs; but finding many obstacles
y, and being much occupied otherwise, I quitted the
out gratifying my curiosity. I returned, however,
and was so diligent in prosecuting my purpose that
ant autumn morning, in company with a dozen stran-
ascended from the garden of the city custom-house
arrière d'Enfer to explore the stony chambers of the

d provided ourselves with wax tapers, which we
each of us carrying one, before we went down a
light of some one hundred steps leading to the dis-
eries running in every direction, and containing the
remains of millions of our fellow-creatures, once as
d ambitious, as fond and foolish, as hopeful and as
any of us are to-day. At the bottom of the staircase
placed himself at our head, and, observing that our
were all in good order, took the lead, after exhorting
eep together, and on no account, if we valued our
o attempt to explore any other than the main avenues
which we were to pass.

Catacombs, to make room for more bodies in those populous burying-grounds. Thus are the great vaults steadily and rapidly increasing their lifeless hosts, and adding to the horrors of a region necessarily horrible from the first.

Several hundred yards from the base of the steps which we had descended is an octagonal vestibule, and over it an inscription in Latin to this effect: "Beyond these boundaries repose those who await a blessed immortality." We passed through a door leading into a long gallery lined with bones from the floor to the roof; the arm, leg, and thigh-bones being closely and regularly piled together in front, their uniformity relieved by three rows of skulls at equal distances, while behind these the smaller bones are thrown, regardless of arrangement of any kind. The gallery conducts to several apartments resembling chapels, called Tombs of the Revolutions, and Tombs of the Victims, because they hold the relics of those who had perished in popular insurrections against existing authority. I had noticed, before reaching the vestibule, and what may be considered the Catacombs proper, that the passage was very narrow, — only two persons being able to walk abreast therein, — and little more than six feet in height. This passage soon made a sharp turn, and at the corner the names of the streets directly above were cut into the stone, and two black arrows painted upon it, one pointing to the entrance of the vaults, and the other to the great charnel-house we were about to explore. We were in chambers of hewn-out rock. Rock was above us, below us, and on every side. The walls were very damp, the water in many places dripping through what might be termed the ceiling, in which were so many cracks and crevices that it seemed as if the walls might tumble and bury us at any moment. Two or three of my companions grew very nervous as they perceived about them such alarming signs of insecurity, and expressed the wish that they had not undertaken what they declared to be a foolhardy enterprise. As I walked along, I saw at different turnings of the passage what appeared to be deep, yawning pits; and feeling a curiosity to examine them, I stopped and stretched my taper over

ide. Appearances were not deceitful. The deep pits really there — dark, awful, and impenetrable. I could elp thinking how easy it would be for any one who d get lost and become bewildered, to stumble into one ese fearful holes and dash his brains out. Even such a sy death would be infinitely preferable to the long agony nfinement in, without any hope of release from, such a of horrors. While I was speculating on the possibility situation, the little procession got quite beyond me, and aroused from my gloomy reverie by the echoing voice guide urging the members of our party to keep close ber. I hurried forward just in time to see the door of estibule open, and to go in with the rest.

e Catacombs are laid out very much like the old quarters ris, the different avenues being named after the streets to them, and the principal buildings overhead being indi- d on the walls. It seemed very strange that certain ous structures, with which I am very familiar, should be y eighty or a hundred feet from where we were walking, hose sepulchral caverns appeared hundreds of miles away n the bright and beautiful city we had quitted half an r before. Nothing can be more dismal and depressing n the Catacombs, with their miles and miles of human es and skulls confronting you wherever you turn, and ming to dance and grin as the light and the shadow of the ing tapers fall upon them.

ow easily we are cheated by the imagination! I could ot have sworn, as I hurried by, that I saw some of the gh-bones move to and fro, and the jaws of the skulls open shut, and extend, in ghastly grimace, a repulsive welcome m the dead to the living, who would soon be no more than ne hideous remains. There is a certain fascination, how- r, I must confess, in the sombre, subterranean city. The ade and panoply of grim mortality held me like a spell, d again and again I found myself far in the rear of the mn excursionists. I liked to fall behind and watch the k shadows which gave way before and closed in behind

them, and listen to the hollow and dreary echoes of their voices murmuring through the mighty vaults. I fancied the babbling company to be a crew of resurgent spirits, whose duty it was to visit the cemeteries of the globe, and awake the dead to judgment. They had a certain weird semblance as they flitted on in the dim distance, and their tones came back to me as if they had fallen from tongues long silent in the grave. The fancy pleased me, and I indulged it, and the kindred fancy that the heaps of bones were animated, until, sometimes, so strong were the suggestions of the place, I really confounded the living with the dead.

Once, in going by an avenue running to the right, I yielded to a temptation to step into it, to look at an extraordinary heap of bones. This did not occupy more than thirty seconds, — at least, it did not appear longer, — and yet, when I stepped back into the broader passage (the main avenues in the Catacombs are much wider than those I have mentioned outside the vestibule), I found, to my utter consternation and horror, that my companions had left me ; I could not see the light of their tapers, nor could I hear the least echo of their steps or voices.

Lost in the Catacombs ! How often I had imagined it ! and now, indeed, it had become a terrible reality. Horror almost paralyzed me for the moment. I seemed to be all nerve and brain, and these thrilled and throbbed so wildly that I was forced to lean against the rock for support. I thought I should go mad, for there was something in the very idea of being shut up in that awful cavern, in the awful silence and awful darkness, doomed to perish by inches, every hour expanding to an age, which rendered any other means of death blissful by contrast. My head swam, and I believed I was about to swoon, when, feeling that to do so was to be destroyed, I roused my will and almost involuntarily sprang forward. My movement was so sudden that my taper was extinguished, and an inky blackness fell upon me like a pall. The horror of my situation was a hundred-fold increased. If I could have lighted my little candle again, I should have

most happy; and yet, a few seconds before, I had re- myself as the most miserable of mortals. My brain to be absolutely bursting, and my heart forcing itself y throat. I was conscious of a sense of suffocation, was not sure that the rocky walls were not pressing to- to crush me. I remember having an anxious longing ey might do so, and end the agony I was enduring. ly admit I had never known before what human suffer- be. I had not supposed myself capable of such men- uish; it was ten thousand times more, and worse, than — an indefinable and overwhelming dread of something might not be named, but that could be pictured with lous power. I had confronted death often, in sickness, strophe, in battle, on land and water, by falling, and by d the so-called King of Terrors had not shown himself terrible as I had anticipated. But then and there, in silent and rayless Catacombs, I was unnerved, over- red, and horrified, by a crushing dread of the unknown. y moment was a month. Every feeling was a minister rror. Exactly what I did I shall never know, though I to have a misty recollection that I strove to kill myself shing my head against the rocks. For some time I was able of determining my conduct; and then, with all my isite sense of mental pain, I was aware of hurrying lly through the thick darkness.

ow long this continued I know not; but of a sudden I beyond me a flash of light like the aurora in the far ern sky. Was I really mad? Was I dreaming? Was d, and waking from the sleep of death? I rubbed my , I pinched myself, I tried to scream, but I could not a sound. Burning as my throat was, and all on fire as med from head to foot, my voice froze as I sought to it utterance.

ll, I was not deceived. There *was* a light before me, as I dashed on involuntarily, I saw that it proceeded the tapers of my companions, whom I had nearly over- . The reaction of my feelings almost prostrated me.

My heart beat like a tilt hammer, my breath was well nigh spent, my pulses leaped with fever, and yet I felt that my face must be blanched, and I should not have been surprised if my hair had turned gray.

In a few seconds I had joined my party and relighted my taper. Nobody knew through what a crisis I had passed, nor did I say anything about it except to remark, casually, that I had extinguished my candle by letting it fall. From inquiries I learned that from the moment I had missed my companions until I had rejoined them, not more than two minutes had elapsed; and still, by the measure of my mind, I had lived through months of pain.

If I had not already known it, I should have been convinced then that time can be reckoned only by feeling; that no clock can keep the record of the heart; and that the soul strikes hours every moment of its existence.

I would advise those who may feel inclined to go through the Catacombs to take a box of wax matches in their pocket, and a little luncheon besides, so that if their taper be blown out, or they be lost, they may at least be relieved from the terror of absolute darkness and immediate starvation. When persons are missed down there, a search is immediately made for them, and nobody would feel half so uncomfortable while he had light and food as he would in the midst of gloom, and haunted by the necessity of dining on himself.

The moist and grave-like odor which fills the Catacombs, added to the images of death on every side, intensifies their sepulchral aspect, and makes those wandering in the ghastly haunts seem to themselves only half alive. The faces of those with me did not appear any more natural than their voices, and all of us had a certain taint of the tomb. Even the tapers flickered and sank in the unwholesome atmosphere, as though even fire, which rages in the centre of the earth, could not support itself in that dusky Golgotha.

In some places the skulls have been arranged in the form of crosses and set into the wall — probably by the priests of Paris, who, like all their tribe, delight in symbols and devices

coupling death and religion; forgetting that the creed they preach declares there is no death, that true religion leads to eternal life. Monks of all ages — and there are many monks who have never taken orders — have been little more than sacerdotal sextons, revelling in disease and decay, lamentation and funerals, as if Nature had set their spirits to the music of bereavement and woe.

Bones, bones, bones! Skulls, skulls, skulls! I can well believe six millions of mortal remains have been deposited in the Catacombs, which look as if they might have been the graveyard of the globe since the dawn of creation. They furnish the most extensive bone-yard I have ever visited. They do not contain nearly so many dead, in all probability, as the Catacombs of Rome: but on the Seine the dead are exhibited to much more advantage than on the Tiber. The French make the most of everything, and their osseous arrangement and display are not equalled anywhere.

Americans have often been laughed at for their fondness for relics, and very deservedly too; for they seek mementos in all places, and under every variety of circumstances. I should never have suspected any of my countrymen of a disposition to deprive the Catacombs of any of their horrors; and yet several of them actually carried off shin and thigh bones in order to recall the pleasure they had experienced in Paris. One fellow — I think he was a medical student from Boston — tried to secure a whole skull; but as he could not very conveniently get it into his pocket, he was reluctantly forced to leave it behind. Possibly he was an admirer of the first Napoleon, and anxious to obtain a souvenir of Bonaparte. I presume I have met men who, if they were given time and opportunity, would despoil that horrid vault of a very large proportion of its revolting treasures.

During our ramble we encountered a well of pure water inclosed by a wall. In it are a number of gold-fish that manage to live by some mysterious means, though the guide informed us that they did not spawn. The well comes from a spring which some of the workmen discovered while making

repairs many years ago, and gave it the name of the Spring of Forgetfulness, afterwards changed to the Fountain of the Good Samaritan. The water is declared to be sweet; but I should need to be extremely thirsty before drinking what would seem infected with death.

The Roman church, always on the alert to point morals and preach sermons, has filled the Catacombs at convenient intervals with inscriptions designed to be impressive. Some of these are, —

"Happy is he whose hour of death is ever before his eyes!"

"Be not proud or boastful, O mortal; for this is the end of the loftiest ambition and the highest glory!"

"Death recognizes not rank -- in his eyes the prince and the peasant are the same!"

"Come, all ye busy worldlings into this silent retreat, and listen to the solemn voice that rises from the tomb!"

"Remember, O man, the mercies of thy God, and remember He will call thee when thou least expectest to hear His voice!"

"The grave is dark; but the paths that lead from it are, to the righteous, strewn with eternal flowers!"

"Mock not the lowly, for in the courts of Heaven the lowly may stand before thee, shorn of thy worldly pride!"

No doubt there is a great deal of truth in these maxims; but in spite of them, and many more like them, death has never been rendered very attractive to persons enjoying good health and a fair degree of prosperity. Death bears about the same relation to life that the Catacombs do to Paris: and I have never yet known any man or woman who would willingly quit the gay Boulevards or the delightful Champs Elysées to walk in the bone-lined and noisome vaults of the subterranean city.

We passed only through the main avenues of the Catacombs, — there is very little variety in them, — and after spending nearly three hours underground, having supped full of material horrors, we reached another staircase, and once more ascended to the light of day, and the blessed sunshine.

idea where we were, and I was somewhat surprised hat we came out nearly a mile and a half from where gone down. The charming capital never, I think, quite so charming as it did on that delicious after- en I returned from death and decay to the living loving, to the comforts and the joys, of the upper

we were in that vast subterranean graveyard, I was the different effect it produced upon different persons party. An Englishman, who was extremely anxious he thing, you know," was superlatively disgusted after passed the vestibule, and declared the Catacombs the st place" he had ever seen. He grumbled like Ve- efore eruption, and swore that the French authorities to be exposed for permitting the subjects of Her Maj- thrust themselves into such a "bloody" hole. He ggested that it was a French trick to get rid of certain d noble Britons, and, of course, threatened to write to mes on the subject. He was constantly predicting that ck overhead would tumble down and bury us all, and seemed uncomfortable because something horrible did ppen. After he had gone half way through, he wanted back, and when he had reached the end of the route, he uch dissatisfied that we hadn't done a great deal more. tted and fumed every minute of the three hours, and did nt to render every one as nervous and discontented as lf.

eral Americans ran all sorts of saws on the Englishman, rophesied some terrible calam y at every step, saying never would have thought of coming into the gloomy nless they had expected that a fair proportion of the ourists would be killed. Two of my countrymen d that they had made their wills before they had left hotel, and a third averred that he had a vial of prussic and a revolver in his pocket for the express purpose of itting suicide, if he should be lost in the cavernous ngs. He asked the Briton if he had not taken the same

precaution, and pronounced him superlatively reckless because he had not, explaining the advantage of self-destruction over a lingering and horrible death. John Bull, remarkable to relate, had not the slightest suspicion that the "Yankees" were poking fun at him. On the contrary, he regarded all their jests as solemnly sincere, and asserted that it was exactly like our nation never to enjoy anything that was not accompanied by a bloody murder of some sort.

A young Italian, who was quite good-looking, and far more conscious of the fact than anybody else, endured martyrdom in the Catacombs from quite another cause. He was very carefully and daintily dressed, and appeared to consider dust or soil upon his clothes as a sovereign evil. He was the dandiest of dandies, and the most fastidious of fools. He looked rather blank, as I had noticed, when we first began the descent of the circular staircase in the Custom House garden. He was in advance, and before we had gone down a dozen steps, I observed a number of large drops falling from the blazing tapers above him upon his new hat and coat. Some kind friend pointed these out to him, and he actually turned pale with wrath and chagrin.

"Who could have done this? Such conduct is disgraceful! I did not come here to have my clothes ruined. I wish the Catacombs were in the bottomless pit." These and other phrases he ejaculated in choice Tuscan, which very few understood, but which those who did understand enjoyed not a little. After the marring of his wardrobe, there could be no pleasure for him. If he had been shown all the wonders of the world, he could not have forgotten his tarnished garments. His misfortunes followed him. The water dropped through the crevices upon his august person, and as he was unusually tall, he crushed his hat every few minutes against the overhanging rock, which struck oaths out of him as steel strikes fire out of flint. I fancied sometimes that he envied the skeletons he passed, because they had no clothes to spoil. Long before he had finished his underground journey, his beauty of person and raiment was sadly injured, and I am

confident that he will remember the Catacombs, and curse them for the harm they did his garments till the end of his days.

A native of Maine entertained us by inquiring constantly of the guide, who could not speak a word of English, while the New Englander had not the least knowledge of French, in regard to the probable cost of the Catacombs, and whether they paid as an investment. He was very desirous to know, also, whose skull this one might be, and whose that, evidently under the impression that all the monarchs and historic characters of France were buried there. Our guide, too polite not to pretend to comprehend the inquisitive fellow, gabbled away in bewildering generalities. The Maine man answered again and again, that he would give five dollars to know what the Frenchman said; and therefore I assumed to tell him. I informed him, though the Catacombs had cost five hundred millions of dollars, that they paid a larger interest than any property in the country; that they were owned by the Rothschilds, who received one hundred dollars from the government for every skull put into the vaults; and that, as there were six millions of them, he could calculate the profits. "By thunder!" he replied; "no wonder those old Jews are so rich. I never knew before how they made all their money. I wonder if a chap couldn't buy a little Catacomb stock."

That mighty charnel-house is not without its tragic history. A number of persons have been lost there in spite of all the precautions against accidents; but these have been very rare of late, because so few persons could obtain admission.

A few years ago, a newly-married couple arrived in Paris from the provinces, having gone to the city on their bridal tour. It was their first visit to the capital, and they were naturally desirous to see its lions. The bride had heard a great deal of the Catacombs, and would not be satisfied without visiting them, albeit her husband endeavored to dissuade her from such a dismal enterprise. She was bent on going, and so they went together. He kept close to her side, constantly fearing she might be lost. He admitted that he

had a presentiment respecting her, and sure enough it was realized.

They had been in the Catacombs something more than an hour, when, having stopped to examine a curious skull, he called for her to look at it, and discovered, to his horror, that she was missing. There were nearly two hundred in the party, and nobody had observed when or where she had disappeared. They all retraced their steps, entered the adjoining passages, and shouted themselves hoarse to attract her attention; but all in vain. Not the least vestige of her could be discovered. The bridegroom was beside himself with grief, declaring that he knew she would never be found, and calling upon the rocks to fall, and relieve him of his misery. It became necessary to drag him from the sepulchral vault, and when this was done, he proved to be a raving maniac. He was sent to an asylum, where such was the violence of his paroxysms night and day, that he died of exhaustion in less than a fortnight. Diligent search was made for the missing bride, though to no purpose. Not the slightest clew was obtained to her fate, and it was finally conjectured that she must have wandered into some tortuous avenue, and fallen into one of the pits which I have described. Such was the melancholy ending of a honeymoon before it had fairly begun.

Another couple, who had been married a number of years, and who had long lived so inharmoniously that they had gone apart several times, entered the Catacombs in the spring of 1853. The wife was missing when the party came out, — it is always the custom to count the number at the beginning and end of the journey, so as to see that none are lost, — and the husband asserted that he had seen her only a few seconds before. Still, she could not be found on that day or the next; but about a fortnight after, a body answering to her description was discovered in one of the narrow passages into which excursionists are never taken. She had evidently been dead some time, and a deep wound on her temple indicated that she might have perished from violence. Her husband was not

free from suspicion of having murdered her; but as she might have been so injured by a fall, he was never openly accused of the crime. The story was generally circulated, and the anti-matrimonial jesters of the capital insinuated that more than a thousand unhappy husbands immediately applied for permission to make the subterranean tour with their wives, in the hope that they might be as fortunate as the ungrieving widower.

Walking one day on the Boulevards, my companion pointed out to me a well-dressed man, who had a certain prematurely old look, and whose hair was perfectly white. I was told he was only thirty-five, and that five years before, he had gone into the Catacombs with a young lady to whom he was engaged, and had hidden himself away from the sepulchral pilgrims for a few minutes, that he might learn how his supposed loss would affect his betrothed. He hid himself so very effectually, that three hours elapsed before he could be found. He had in that time entirely surrendered all hope of release, and the physical changes of years had fallen upon him. He has often described his sensations during those hours, and has represented them as the most terrible he could conceive of. (I can imagine, yes, even understand, what they must have been by my own experience.) The revolution in his mental was as great as the revolution in his physical nature; and after his distressing sensations, all his freshness and buoyancy of feeling departed. With a strange morbidity, he associated the young lady on whom he had wished to try the sentimental experiment with the agony he had endured, and though she was as wretched as any woman ought to be when he was missed, he broke off his engagement, and refused to see her again after that eventful day. The gentleman may be living still; for, in spite of appearances, he had an excellent constitution and vigorous health. He was in good circumstances, and went to dine regularly at the *Cafe Anglais*, where he had told his story so often, that he had received the name of "Catacombes" Beaudinet. Nothing remarkable except that had never happened to him, and as he was a Frenchman, and fond

of prattle, his one adventure filled him, and rendered him a bore of the first water.

As is well known, the French not only have a passion for suicide, but a passion for committing it at certain places, and in certain ways, that seems to be contagious. Forty years ago, a young journalist, while exploring the Catacombs in company with many of his acquaintances, naturally fell to talking on the subject of death, and expressed his opinion that there was nothing awful in it, or even unwelcome. Some of his friends rallied him on this position, and told him he would think very differently if he were conscious that death was near at hand. He stoutly denied that it would change his sentiments in the least, and when nobody appeared to believe him, he suddenly drew a small knife from his pocket, and before any one was aware of his intention, he thrust it into his heart. His suicide, in such a place too, filled his friends with horror, and the press, as he had been a member of the guild, gave detailed accounts of the tragedy, accompanied by strange theories and analyses of the causes that must have led to it. For several weeks, the Paris journals were full of communications on the subject; and they so aroused public attention and curiosity, that in less than six months nearly twenty men stabbed themselves to death in the Catacombs — all of them unquestionably the effect of example.

The Catacombs are the reverse side of the fair picture of Paris. Never since my journey through them have I been able to forget that they lie black and yawning under some of the most beautiful quarters of the capital. When the sunshine is brightest along the Seine, I think of the darkness below. When the city smiles fairest, I recall the millions of grinning skeletons underneath. When the music from the gardens, and the concerts, and the operas sounds sweetest, I fancy mingling among the strains a mournful dirge for the departed and forgotten, so confusedly heaped together in the awful dreariness of the Catacombs.

— THE FIRE FIELD OF THE CASPIAN. — THE FIRE WORSHIPPERS. — ...RANGOON DISTRICT. — FIRE WELLS OF THE EAST. — PETROLEUM IN ...A. — ITS DISCOVERY AND HISTORY. — OIL FEVER. — ANECDOTES OF ...ATION. — FORTUNES WON AND LOST. — EXTRAVAGANCES OF THE ...RICHE. — THE STORY OF JOHN. — HOW TO GET UP A PARTY.

...rious parts of the world there are springs, or natural ... of inflammable oil. Some of these have been known ...sands of years, but most of them are of recent dis- ... The oil which flows from these springs is generally ...s "petroleum," the word being of Latin origin, and ...g rock oil. The most productive oil springs are of ... origin, and are made by boring into the earth, or ... certain localities. The most famous natural deposit ... substance, or anything akin to it, on the surface of the ... in the Island of Trinidad, in the West Indies, where ... a lake of asphaltum and petroleum, which is called ...e. This material is a very good substitute for pitch, ...xtensively used for coating vessels, and preserving ...ber.

...tleman who has visited this lake says that it is about ...from the sea-shore, and the distance around it is about ...and a half. Near the shore the tar is solid, and appears ...had cooled, when the liquid was boiling, in large bub- ... As one goes from the shore to the middle of the lake, ...perature increases, the matter becomes softer, and in

is a bed of coal under the lake. It is of bituminous character, and makes a thick smoke when burning.

The largest supplies of petroleum are obtained in America. Throughout Europe and Asia there are many petroleum wells. One of the most celebrated localities where they are found is the eastern shore of the Caspian Sea. At Baku, on the shores of the Caspian, there are many springs of naphtha and petroleum, and a great many streams of inflammable gases. The abundance of these wells caused the region to be called The Field of Fire; and in the ancient times Baku was known as the Sacred City of the Fire Worshippers. The annual value of this production is about half a million of dollars. About fifteen miles from Baku there is a jet of inflammable gas rising from the rock, and known as the Perpetual Fire. A temple has been built over it, and the fire has been burning for hundreds of years. Pilgrims come from all parts of Asia to visit this sacred well. The place is in charge of a large priesthood, who are supported by the gifts of the devotees.

Another region, quite as wonderful as that of Baku, is the Rangoon district, in India; and a considerable portion of India has been, for thousands of years, supplied by it with rock oil. One authority says, that the number of wells in that district is nearly six hundred, yielding half a million hogsheads of oil annually. Most of the Rangoon wells are artificial, and are sunk in beds of sandy clay, resting on the sandstone, but the wells rarely exceed a hundred feet in depth.

Some parts of Africa are known to contain petroleum springs, and there are many of these springs throughout China and various other regions of the East; Australia and New Zealand claim their share, and it is probable that every country on the globe could, by means of proper borings, be made to yield petroleum.

As before stated, America is the great petroleum-producing country of the world. Rock oil is found in various parts of the American continent, from Hudson's Bay to the Gulf of Mexico, and from the Atlantic to the Pacific Ocean. The most prolific oil region in America is in Western Pennsylvania, and

[illegible] New York, was named Oil Creek, on account [illegible] petroleum floating on its surface, and the same name [illegible] to another stream in Venango County, Pennsyl- [illegible] On the old maps of that region several localities were [illegible] affording oil, but it is only within the past thirty [illegible] the oil product has been of any importance.

[illegible] substance, as before stated, was used as a medicine, [illegible] inhabitants collected it by spreading blankets on the [illegible] of the stream, and then wringing out the oil which [illegible] orbed. There are indications that the oils were col- [illegible] ing ago, as several deep and very old pits have been [illegible] ed. Some people attribute the construction of these [illegible] the early French settlers, some to the Indians, and [illegible] the predecessors of the Indians. A history of Penn- [illegible] published thirty years ago, says that the Indians [illegible] oil to mix with paint in dressing themselves, and [illegible] an old letter, written by the commander of Fort [illegible] to General Montcalm, describing an assembly of [illegible] night on the banks of the creek; and in the midst [illegible] ceremonies they set fire to the oil on the surface of [illegible] r. As the flames burst out, the Indians gave wild [illegible] which recalled to the writer many of the ceremonies [illegible] ancient fire worshippers at Baku.

[illegible] early settlers did not collect great quantities of oil,

were made for salt water. An account, descriptive of the work, said, "They have sunk two wells, which are now more than four hundred feet deep. One of them affords very strong and pure water, but not in great quantity. The other discharges such vast quantities of petroleum, or, as it is vulgarly called, Seneca oil, and besides is subject to such tremendous explosions of gas, as to force out all the water, and afford nothing but gas for several days. We make but little or no salt."

This story of the ignorance of the value of petroleum and the disappointment of the salt-makers at finding springs of petroleum instead of salt water, reminds one of the account of the Irishman who complained of his trouble in shooting ducks: "I was not able to fire a shot," said he. "Every time I got sight of a duck another one swam in between him and me, and I could not kill anything."

The first movement for utilizing this vast oil product was made, in 1854, by two New Yorkers, who organized a company, and secured the right to a certain spring on Oil Creek; but they made no progress until three years later, when Messrs. Bowditch and Drake, of New Haven, undertook to search for oil. In the winter of 1858 and '9, Colonel E. S. Drake completed arrangements for boring into the rock below the bed of the creek. On the 26th of August, 1859, oil was found at a depth of seventy-one feet. The drills sank into a cavity in the rock, and the oil rose to the surface. By means of a pump, four hundred gallons were obtained per day, and a larger pump being introduced, the supply reached one thousand gallons daily. This was the beginning of the borings for oil in that region. Every spot where oil was found, or was likely to be found, was carefully examined, and a great many wells were put down. Up and down the banks of Oil Creek derricks were erected and wells were sunk, and in a year or two the banks of the stream looked as if their natural product had been derricks rather than trees. The ground was perforated like a sieve, and if the holes had been a few feet, instead of a few inches, in diameter, it would have

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ngerous walking round there for fear of tumbling
. The original depth of seventy-one feet was found
ient, and the borings were frequently continued to a
of several hundred feet. I believe one well was sunk
e thousand feet, and a great many wells exceeded a
d. Many of them never produced oil, and the man
d risked his money to bore these wells saw it vanish
affording anything in return.

ut many stories are told of fortunes made and lost in
for oil. In some cases men just narrowly missed suc-
s in others they obtained their success by accident.
e told of some men who had secured a locality and
eir drills to a depth of nearly a thousand feet. All
money was gone, and they knew not where to obtain
There were no indications of oil, their machinery was
ged, and the sheriff stood by to secure it. They were
to abandon work; it was near the close of the day, and
had no credit and no means to continue work on the
ing morning. One of the men proposed to quit about four
ck in the afternoon. "No," said the other; "let us die
, and put the machine through till sunset."

tore away a piece of the timber supporting the
ck, and threw it into the furnace to give additional
d to the engine. Just as the sun was beginning to dip
d the western hills, the drill suddenly sunk several feet.
s withdrawn from the rock, and a column of oil mixed
salt water followed it. They had "struck oil," and
saved.

another instance a company was formed, and had drilled
en wells, but without success. Their capital was nearly
, and they were working on a well which, if unsuccessful,
d prove their ruin. Just as they had expended almost
last dollar, and were within twenty-four hours of sus-
ding, they found oil in abundant quantities, and were
d from ruin.

ere are many instances of men searching for oil, boring
wells to a considerable depth, and abandoning them in

consequence of the exhaustion of their money, and the di couraging prospects. After abandoning their work, others too possession of the places, and in a few days, sometimes in few hours, opened wells of great value.

In the oil regions I was once told a story of two men wh had been at work a long time, but could get no oil. Their money was exhausted, and they became discouraged. When they had expended their last dollar, and mortgaged everything, they stepped aside and made way for their creditors. As they surrendered their machinery, one of them said, —

"Let us clear out of this place, and go to work by the day until we can get enough to try it again."

"Hold on," said the other; "let us sit down and see these fellows work. We will stay a little while, and see if they get along as fast as we did."

So the two men remained, mainly for the reason they did not know what else to do.

The new comers drilled away at the well, which was already several hundred feet deep, and in half an hour after they began working they found oil. When the tools were withdrawn, the well began flowing a hundred or more barrels per day. Imagine the disgust of the former owners!

It was the same in the oil regions with regard to disappointments that it has been in California and other countries containing mineral treasures. A case like the one just described is almost an exact parallel of a case in California, where two men, working a week or more on a claim where they hardly made money enough to pay their expenses, abandoned it in disgust. Two others stepped in, and on the very day they took possession, found a lump of gold worth several thousands of dollars. In another instance some Americans abandoned a claim, which was immediately occupied by half a dozen Chinese. The Chinese found a rich deposit of gold within six inches of where one of the Americans had abandoned the use of his pick and shovel.

Petroleum wells can be "salted" or "baited," just as gold or other mines can be salted, and in the early days of the oi

ver, the baiting of petroleum wells was by no means an uncommon thing. Sometimes it would be done by one of the owners of a well in order to defraud other owners. For instance, Smith and Brown have entered into partnership to sink down a well. They join their money together, buy the necessary drills and machinery, and go to work. The well is sunk one or two hundred feet. Smith gets tired of it. He knows that Brown has more money, and so thinks that he will back out. While Brown is asleep, Smith gets a barrel or so of petroleum, and pours it into the well. Next morning, when they go to work, the condition of the hole is tested as usual, and of course there are indications of petroleum. If a barrel has been poured into the hole it is filled for quite a long distance. Smith has taken care to be away at the time, and appears in perfect ignorance. If Brown is honest he will tell Smith, on his reappearance, of the rich supply they have found; but the chances are two to one that Brown will say nothing, except to suggest carelessly that the well is not very promising, and ask Smith what he will give for his share. Smith says, with equal carelessness, "I don't want to buy, but I will sell my interest for three thousand dollars." Perhaps he puts it at a higher figure. He knows the length of Brown's purse, and goes for its contents. The result is, that Brown secretly chuckles over his speculation, and buys the well.

Smith goes on his way rejoicing, and Brown, still more rejoicing, stays where he is. He knows that a few inches more of depth to the well will yield abundant oil, and he works away very earnestly; but somehow he keeps on drilling for a long time, and at last awakens to the consciousness that he has been sold.

A great many petroleum wells have been salted and sold in this way, but it sometimes happens that the would-be swindler gets the worst of his bargain. I knew one case, in 1863, where a man baited a well in the above way, and sold it. He laughed that evening over his sharp trick; but he laughed less the next morning, when he passed the well and saw that the

tools had been withdrawn, and the well was flowing at the rate of three hundred barrels a day. A few hours after the purchasers entered upon their work, they struck oil and were happy.

A trick that has been practised in the oil regions to some extent is to convert a well which has no oil in it into a genuine flowing well. I have known this to be done by conducting a pipe underground from a tank at a genuine well a few hundred yards away. The pipe opens into the baited well, and it can readily be seen that with a good "head" on the pipe the well will be a perfect flowing well, to all intents and purposes. Men are engaged in barrelling the substance, and a visitor can see with his own eyes the amount of the yield. If he wants to buy a well, nobody has any great desire to sell, and he may have difficulty in buying the whole thing outright; but he can get an interest in it for a comparatively low figure. Sometimes he may buy one man's interest, and then another man's, and he thinks he has struck a very fine bargain. But during the night, after his purchase, the oil ceases flowing, and he finds that his property is worthless.

Another swindle of the same sort is to have a tank filled with oil, and a pipe run through one of its supporting posts, and under ground into the well. The pumping machinery is kept at work, and it may be pumping, say, at the rate of one hundred barrels a day. But all the time that the pump is working, the oil is running into the well, and it may run in and be pumped out again and again. The operation is a simple one, and well calculated to deceive.

A great many petroleum companies were organized at one time, which had no existence beyond the paper one that they had in New York and other cities. Some of these companies gave most brilliant promises. I remember one which printed a flaming prospectus, and announced that there was room on its territory for three thousand first-class wells. No one could doubt the truth of this assertion, but its territory happened to be on the top of a mountain, where three hundred thousand wells might have been sunk without finding a

op of oil. The projectors of this concern sold a great deal stock, but I believe they never declared a dividend of a gle dollar, or even took the trouble to sink a well. Their ney was made by defrauding their patrons rather than by ing any work in an honest way. Millions of dollars were nk in oil speculations whose investors never obtained any turn whatever. The public heard of the wells that yielded rmously, but they never heard of the thousands of wells t never amounted to anything.

So great was the rage for oil speculation during the height the fever, that a well would be sunk where there was the st chance or prospect of obtaining oil. Suppose a man nd a spring of pure water; he might pour a gallon or so of l on the surface, and then carelessly, and with apparent inno- nce, lead a stranger to the vicinity. The stranger soon ells the oil, examines the water, and buys the spring at a igh price.

One day a farmer broke a kerosene lamp in his cellar. A w hours later he admitted a stranger who wanted to buy me potatoes. The stranger discovered the oil, forgot about the potatoes, and immediately opened negotiations for buying the house and the land on which it stood. He paid about three times as much as they were worth, and the farmer went way happy.

A man, who thought crude petroleum a good remedy for freckles, one day bathed his face in that article, and lay down to sleep. As he tells the story, he was waked in half an hour by a New York speculator who was trying to sink a shaft into his ear.

A story is told in California of a man owning a farm which e wanted to sell. He had heard of the petroleum dodge, nd thought he would try the same plan in another way. So ne day, when a lot of speculators from San Francisco were at his house, he poured a gallon of whiskey into a small spring, and then led the speculators in that direction. The farmer spoke of the spring, said that he made no use of it, as he had an abundance of water near his house. He had never observed

the spring except to remark its peculiar color. He roused the curiosity of the strangers so that one of them tasted the water, winked at his neighbor, and stepped aside. Before night the farmer had sold his place at a high price, and the speculators had organized a company for supplying the California market with an excellent article of whiskey cocktail. But somehow their enterprise never succeeded.

The immense fortunes made from petroleum speculations were almost marvellous; a man might be poor to-day and worth a million dollars to-morrow. In the morning he could not raise enough money to buy a breakfast, and at noon his credit would be good for the purchase of a first-class steamship. A man might be working as a day laborer this week, and his wife would be taking in washing at a dollar a dozen. Six days later he would be a millionnaire clad in broadcloth and fine linen, and wearing a diamond like a calcium light, while his wife would be arrayed in silks of the most costly character, and wearing them as uneasily as a bull-dog wears a pair of trousers tied around his neck.

A good story is told of a woman one day selecting some diamonds in a jewelry store on Broadway. Two other women were standing near and observing her motions. One of them suggested to her friend, "Evidently shoddy."

The diamond purchaser raised her eyes for a minute, and said, "No, madam; petroleum."

A great many stories are told of a youth in the oil regions who was brought up on a farm, and who, for a year or more, after the outbreak of the oil fever, was driving a team at fifteen dollars a month. He had a grandmother, as most young men have, but she was unlike a great many grandmothers, as she was enormously rich. She owned a large farm, and leased it to speculators who wished to search for oil. She always stipulated for half the oil, and her farm was so productive that she had a magnificent income, and accumulated money at a very rapid rate. A common report was, that she had eleven barrels and four trunks full of greenbacks.

One day she did as all good grandmothers do, — she died.

engaged several youths of his acquaintance to as-
in wasting his substance in riotous living. The
ent first to Cleveland. At the railway station they
a dispute about a carriage, and so John bought a car-
take them to their hotel. When he reached the ho-
concluded that that was not the kind of carriage he
and so gave it away. He secured all the best rooms
house, ordered the best supper the proprietor could
and the party went to bed on the floor as drunk as a
of badgers. They rose the next morning with very
heads on their shoulders, and were occupied during the
in removing their Mansard roofs by means of soda
and cocktails.
ent for the best team in Cleveland, and obtained a
one, with a carriage gorgeous enough for a third-
peror. He picked out one of the drivers round the
the hotel, told him they were going to stay in Cleve-
few days, and if this driver would take the team and
them round during their stay, he should have the whole
at their departure, for his trouble.
next proposed to charter a grog-shop, and another
on which shall be nameless, for the exclusive use of
and friends during their stay. They made things
for a few days, and then left for Philadelphia by way of

private show, but he changed his mind and continued his journey.

In Philadelphia, and subsequently in New York, the party was guilty of various extravagances, and sometimes displayed absolute ingenuity in getting rid of their money. On one occasion they treated a party of fifty or more street laborers to champagne, filling each of them up to his chin, and sending them home blind drunk. They bought horses and carriages to give away next day. They chartered hotels and other public resorts for their exclusive occupation. They used to give away ten-dollar bills, and sometimes hundred-dollar bills, as gratuities to servants.

John seemed to be troubled to know what to do with his money, and it gave him more anxiety than he was ever blessed with during the days of his ox-driving experience. I believe he died after a year or so of this new life. It was too much for him; he could endure poverty, but he could not enjoy or endure such an accumulation of wealth.

There was a case similar to his of a young man growing suddenly rich through petroleum, who started on a riotous career, and managed to get heavily in debt. The wells gave out, and left him without money, and no prospect of obtaining any. In a year from the time of his becoming so suddenly wealthy, he was at work again as a day laborer, and meditating upon the uncertainties of life in the oil regions.

On one occasion an oil speculator came to New York with fifty thousand dollars or more in cash, and claiming that he had a flowing well yielding two hundred barrels a day. In less than a fortnight he had gambled away his money, sold his wells, and the last I saw of him he was on his way to the station-house for default of paying the amount of his hotel bill. He was kept there a short time, and then released. I believe the hotel never received anything from him.

A great many extravagances have been committed by the petroleum aristocracy. Persons suddenly raised from poverty to affluence are nearly always anxious to effect an entrance into society. They take fine houses, and sometimes the

get people of repute to visit them, though not

r four years ago a family that had suddenly grown
ained to give a party that should introduce them
. They made preparations, and sent out a great
ds of invitation. They ignored their former ac-
ce altogether. They selected the names of their
m the City Directory, taking those that were prom-
the social world. They even pretended to an aristo-
cent, and I believe their card of invitation bore a
me sort or other.
ning of the entertainment came. Madame, almost
in silks, with a large amount of store hair, and
th diamonds enough to set up a jewelry store, was
to receive her guests. The daughters were in their
expected to make a dozen conquests apiece in the
the evening. A magnificent supper had been pre-
nd a troupe of servants were awaiting the commence-
their duties. Eight o'clock was the hour fixed for
y.
ight o'clock there was not a guest in the house.
," said Madame, "they will be here very soon."
t eight o'clock came. Nobody. Nine o'clock. No-
Half past nine. Nobody; and then ten o'clock, and
body. It was then the great truth stood revealed that
y was a failure.
servants, who had been standing about with their
in their cheeks, were commissioned to eat what they
of the gorgeous banquet, and the aspirants to social
smothered their sorrow, and made no more attempts,
t season at least, to get into society.

XXIII.

WINE AND BEER CELLARS.

WINE CELLARS. — HOW THEY ARE MADE. — PLACES FOR STORING BEER. — THEIR EXTENT. — THE GREATEST WINE CASK IN THE WORLD. — ITS CAPACITY. — PECULIARITIES OF WINE AND BEER VAULTS. — VISITING A CELLAR IN POLAND. — CURIOUS SIGHTS. — THE ANTIQUITY OF THE BOTTLES. — WHAT A VISITOR DID. — THE RESULT OF TOO MUCH WINE. — A DANGEROUS BRIDGE.

A GERMAN resident of New York, engaged in the manufacture of beer, visited the excavations at Hallett's Point, near the upper end of Manhattan Island, and, on viewing the large space which had been dug out of the solid rock, exclaimed, "What a capital place for storing lager beer." Many a wine and beer manufacturer has made the same remark on visiting the Mammoth Cave, or other huge caverns. The best places for storing malt or vinous liquors are under ground, for the reason that an equal temperature can be maintained at all times; summer's heat and winter's cold make but very little change of the thermometer in the depths of the earth.

In various parts of the world, particularly in Europe, there are vast underground spaces specially designed for the storage of wine, beer, and similar beverages. Nearly all these articles require to be kept some time before they are fit for use; especially is this the case with wines, some of which improve steadily during a year, or for ten, or twenty, fifty, or it may be for a hundred, or five hundred years. Some of the wine cellars of Europe have been hewn out of the solid rock, or dug out of the solid earth, at vast expense, for the simple purpose of storage. Other wine cellars were, originally, quarries, or mines; and after they had been abandoned by the miners, they were taken up by the wine and beer manufacturers, and adapted to their present uses. The same is

the case in America. Reference is made elsewhere to the cellars of Dubuque, Iowa, which are nothing more nor less than exhausted lead mines. At several places on the Mississippi and Missouri Rivers there are cellars which originally were quarries or mines. Their natural treasures were taken from them, and they are now filled with artificial ones.

In California, particularly in the Sonoma Valley, are some wine cellars which have been dug out of the rock for no other purpose than for that of storage. Some years ago I visited one of these establishments with a small party, and the proprietor, in order to give us an idea of the temperature, shut us up a little while, and left us to ourselves. The place was not cold, but it was cool compared with the outer atmosphere, and we very soon began to sneeze. Had we been kept there for any length of time, I suspect that we would have had sore throats and all that sort of thing; but they were prevented by the select assortment of liquids which the wine manufacturer supplied to us with such liberality that some of his visitors' legs became very much entangled, and refused to perform the duty usually required of them.

All through Europe, and particularly in France and Germany, there are cellars of great extent. The wine makers of France and Germany are able to store away thousands of casks, and other thousands of bottles, every year without any difficulty. The same is the case with the beer makers of North and South Germany, particularly in the vicinity of Munich and Vienna. There is one wine cellar on the Moselle, which is said to be capable of containing a million bottles and twenty or thirty thousand casks of wine at one time, and I have heard of one wine cellar even larger than this. The capacity of the beer vaults of Munich is, I think, greater than that of the German and French wine vaults. It is certain that a storage capacity sufficient to supply the annual consumption of beer in Munich, Vienna, or Berlin, must approach the dimensions of a small city. It is well known that the average German can get outside of a great quantity of beer in the course of twelve months. As an illustration, I may mention

that the day before writing this paragraph I was told of a strike among some German laborers in an establishment near New York. Their strike was not for wages, but for beer. They were satisfied with the pay they received, but not with the quantity of beer furnished to them. Their employer allowed them two five-gallon kegs daily for every three men, and in their strike they demanded a daily keg of beer per man. They said that two thirds of a five-gallon keg were not sufficient, but they would manage to get along with five gallons each per day. The employer agreed with them, and they resumed work as soon as he consented to their demand.

It is on record that one individual German drank one hundred and fifty glasses of beer per day, and I believe there was an instance in Cincinnati, a few years ago, where a German consumed, on a wager, one hundred and eighty-eight glasses between sunrise and sunset of a summer's day. It is not fair to take these ambulatory beer casks as an indication of the drinking abilities of the Teutons, but it may safely be assumed that an ordinary community of Germans can get outside of an average of twenty glasses a day per man without feeling it.

It is not my province to describe the process of making beer or wine, as the work is mainly performed above ground, but simply to allude to the space where these beverages are stored. I have visited a fair proportion of them in various parts of the world, and they are all pretty much alike. They are simply large vaults or caves, sometimes arched over to prevent the falling in of the earth, while in other cases they are cut out of the solid rock, and require no arching. Sometimes a wine cellar will consist of a single vault, with regular pillars or arches sustaining its roof, while in other cases there will be a great many galleries, or tunnels, running off in different directions. Sometimes the casks containing the wine or beer will be of a size that will permit of their being rolled about, while in other cases the casks or tuns will be so large that they always remain stationary, and are filled and emptied without being moved from their places. An example of this is the celebrated tun of Heidelberg, constructed in 1751.

pable of containing forty-nine thousand gallons. It has filled but two or three times since its construction, and ocess of filling occupied on each occasion two or three It is sufficiently large to allow the erection of a ball- pon it, and several festivals and dances have been held It is the largest cask which has ever been made, or y ever will be made.

preparation and preservation of wine require great d, above all things, an even temperature. Many a cask has been spoiled by being kept too hot or too cold: is one reason why the preference is shown by wine for underground places of storage. Apart from this the saving that can be made by utilizing the space the earth where the surface is of great value.

efore stated, a visit to one wine cellar is very much like to another. The stranger is led or guided among rows and bottles, and sometimes his underground journey mount to a mile, or two or three miles, of linear distance. onders how the demand can be so great for this material, a countryman wonders, as he walks through the mar- f a large city, how all the beef, pork, and mutton can find hasers. He may go through a market and think the sup- xceeds the demand, just as when he walks the streets for ar or two, and sees the crowds of people, he will wonder all this mass of humanity can find sufficient food. In ame way a person unfamiliar with the business may alternate surprises about the supply and consumption ine.

e of the first wine cellars which I visited in Europe was famous city of Warsaw, Poland. I had entered Europe e back door, as it were, coming from Asia over the Ural tains; and consequently the first ancient city I found s there was any wine trade of significance was War- A travelling friend and myself were under the guid- of an officer serving on the staff of the governor of nd, and while pointing out the curiosities of the city, he gested taking us to one of the oldest wine cellars in

Europe. I think he said there were a few, but only a few, which had greater antiquity.

Our party was small, — only three of us altogether, — and we drove in a single carriage to a very unattractive place in the Jews' quarter of Warsaw. We entered a narrow and rickety-looking building, which gave no promise of the wealth stored away beneath it. The officer was acquainted with the proprietor of the place, so that we easily obtained permission and escort for our underground journey. The proprietor himself took charge of us, and was accompanied by a servant to assist in showing us round, and possibly to see that we did not stow away in our pockets any of the valuable bottles in the cellar.

We descended a narrow stairway, so narrow, in fact, that we went singly, and so low that we were obliged to stoop to avoid hitting our heads. The place was hewn out of the rock on which Warsaw is built, and it was arched over to sustain the weight resting upon it. Reaching the floor of the cellar, we were first led between rows of casks, and the ages of the casks were stated as we walked among them. One was pointed out that had been in the cellar thirty years, and another that had been there two or three times as long. They were covered with dust and cobwebs, and looked as if good for a much longer stay. Over our heads we could hear the rumbling of carriages in the streets, just as one can hear the carriages in exploring the ruins of Herculaneum.

Cask after cask was pointed out, until our eyes were wearied, and we were then taken to the old cellar where the bottles were stored.

Our guide explained that the cellar we had just visited was a modern one, only two hundred and sixty years old. The old cellar, he said, was made in the days when Poland was a kingdom, and more powerful by far than the now great Muscovite empire. I do not remember positively the age he gave it, but I think it was some nine hundred or a thousand years old. I was too busy looking among the bottles to take particular notice of what he said, and am not willing to trust

...ty years; another where they had not been touched ...ty, another for forty, and another for fifty years. ...most of the shelves a date was chiselled into the rock, ... date, as I was told, indicated the time when the wine ...ttled and placed there. These chiselled places were, ...r, comparatively few, as the most common designation ...s of a date cut in a small piece of board which rested ...e bottles.

...me places the dust of ages had almost obliterated the ...but our guide seemed to know them all from recollec- ...I remember one date of 1750, another of 1634, and I ... there was one board dated somewhere about 1590, ... were pointed out which were said to contain wine ...d not been moved or disturbed in any way for three ...d years. I do not vouch for the truth of the statement, ...ely give it as I heard it.

...s interesting to observe how the dust and cobwebs ...hered about the bottles, and also to observe the shapes ...bottles. The more recent shapes were those familiar ...drinkers and friends of drinkers of the present day. ...there were short, thick-set bottles, while others were ...y and very long in the neck, reminding one of an over- ...ose or a camel suffering with the dropsy. Some of the ...r bottles indicated that the art of blowing glass was not ...known at the time of their construction, as they were ...moulded and frequently had deep indentations in their

that had been tightly closed by melting their ends in a after the wine had been placed inside, just as the tub thermometer is closed after it has been filled with silver or alcohol. In order to get at the wine enclosed i way, it is necessary to break away the top of the neck.

The cellar was perfectly dry, so that no moisture col anywhere. I may remark, by the way, that a dry cel always desirable. There was no moisture, but there liberal supply of dust and cobwebs. On bottles that hac in their places only a few years, there would be a sligh or covering of dust. Those that could boast of twenty and those that had remained undisturbed a hundred o hundred years, were covered so thickly that it was almo possible to distinguish the bottles from the mass covered them. I saw one shelf—I forget its age—v not a bottle was visible; it seemed to be a mass of cob and nothing more. To judge from its appearance, I not have given twenty-five cents for the contents of that but if I had offered twenty-five hundred dollars, my would have been spurned with disdain. I asked the val the wine on this shelf, and was told that it was tv guineas a bottle. I did not want any of it at that price, presume that there are plenty of men in the world wh ready to pay it.

After we had seen the curiosities of the place, the pr tor insisted that we should make a practical test of his He did not open any of the twenty-guinea stuff, and we not expect him to, though I secretly hoped he would co himself sufficiently honored by our presence to do the some thing, and break a bottle or two of it just to give taste. The best he would do was to open a ten-guine tle from another shelf. It is not every day you can your lips over wine worth fifty dollars in gold a bottl we sipped it very carefully, and allowed it to trickle n rapidly down our throats. I found it a very agreeable it had a rich and fruity, though rather sweetish taste. I nothing to which it can be compared, and therefore I w make any comparison.

The proprietor treated us on the descending scale, for the next bottle he brought us was a five-guinea one. It was only forty or fifty years old, a very juvenile stuff, but we were unable to discover any great difference between it and the other. Two or three kinds of this wine were shown us, and then he brought all sorts of new wines just in the cellar, that is to say, they had only been there some five or ten, or it may be twenty years. Other wines were brought forward for our deglutition; and after a time the thing became a little monotonous, and I suspected that we might get our heads and feet a little tangled. I suggested that we had other business to attend to, and had better not indulge in the wine business any longer; but the proprietor was polite, and was constantly offering us just one more sample.

"Have the gentlemen taste this one," he would say to the officer who accompanied us, and at the urgent request of the officer we would indulge the proprietor.

The officer repeatedly stated, on presenting the wine, that that would be the last; but somehow there was always something new to be tasted, and something that we could not decline without giving offence. Before we got through, we tasted nearly every wine in the cellar, and finally asked to be let off.

When we reached the foot of the stairway, we found it had shrunken greatly in size. We had descended without difficulty, but now it was necessary to move up edgewise, and I firmly believe, that if we had remained below much longer, the shrinking process would have made the staircase so narrow, and the roof above so low, that we should have been unable to get out, and might have staid there forever. Think of one's terrible fate in being shut up in a wine cellar to die.

My companion wanted to sit down on the foot of the stairs and go to sleep, but I told him it was not a custom in Poland on visiting wine cellars, or, so far as I knew, in any other country. He then asked me to write to his friends, if I succeeded in getting out, and tell them to send money enough to buy out the concern to take it home to America.

He would take cellar and all if he had to carry the whole city of Warsaw and the Ex-King of Poland in his trunk. He had a friend at New York who would just like this sort of thing. He would be willing to sell all his interest in the United States if he could only assemble his friends in that cellar, and get them as blind drunk as he was. I saw that he was wandering mentally, although unable to wander much physically, owing to the extreme suppleness of his legs. He began to chide me for taking so much wine, and said I ought to have followed his example, and drank nothing.

The situation became alarming. There was the staircase growing narrower until it resembled a loophole in the wall of a fortress. I was very much inclined to sit down with my friend, and wait until the place grew larger. While thinking what to do, we were roused by the appeal of our officer comrade to taste of another wine, a very superior article from Hungary. We told him politely that we must refuse, intimated that we should feel much better without it, and if he could only plan some way by which we could get out of that cellar and reach our hotel, we should be very much obliged.

He led the way up stairs. We observed that luckily they were large enough for him to ascend without difficulty, and finally we reached the space above. Once there we breathed more easily. We thanked our host for the attention he had shown us; we thanked him by shaking his hand, and keeping our mouths closed. To thank him in English would do no good, as he did not understand our language, and we were a little doubtful of our ability to pronounce our words correctly. I am sorry that my friend made so free with the ancient wine, as it totally incapacitated him from saying a word in Polish or any other language with which he was familiar.

When we reached the open air we found that our heads became level again, and in a little while the effects of the wine-sampling excursion had passed away. Assuming the dignity of a couple of emperors, we rode to our hotel, had lunch, and felt better.

All over the world it is a trick of the proprietors of wine cellars to put their visitors through the system of sampling, so that, drink as sparingly as they may, — a teaspoonful at a time only, — they will be very much confused in body and mind before they emerge from the clutches of their entertainers.

In one of the Western States I am acquainted with a wine dealer whose cellar is entered by crossing a narrow bridge over a brook. The bridge is ten or twelve feet long, about three feet wide, and has no railing. I have heard him say that no visitor to his wine vaults ever yet walked that plank on his return from the cellar without tumbling into the brook. From what I have heard of his establishment, I think he is not very far from the truth. Many a visitor to that cellar has received an involuntary plunge bath as he came out into the open air.

XXIV.

THE BASTILE.

ITS HISTORY AND CONSTRUCTION. — THREE AMERICANS SEARCHING FOR IT. — A FRENCH JOKE AT THEIR EXPENSE. — HOW PRISONERS WERE RECEIVED AND TREATED. — HORRIBLE DUNGEONS. — THE OUBLIETTES. — CRUELTIES OF THE BASTILE. — THE MAN IN THE IRON MASK. — HIS ROMANTIC STORY. — DESTRUCTION OF THE BASTILE.

ONE of the most famous dungeons or prisons in the world was the Bastile of Paris.

It was a state prison and citadel of the city, was built in the year 1369, and destroyed by the mob in the beginning of the revolution of 1789, or more than four centuries after its construction.

It is a curious fact that no plan of the Bastile as originally constructed is in existence, neither is there any plan extant of the Bastile as it appeared at the time of its destruction. Somehow the kings of France were averse to giving the public much information about this famous prison of state. They appear to have been satisfied with the knowledge that the place existed, and that those who displeased them could be shut up there, and they never troubled themselves to know the exact plan or model of the concern.

There has been a great deal of exaggeration concerning the Bastile, and many stories have been told about it which had little or no foundation. After all, there was really no need of exaggeration, for the atrocities committed within the walls of the Bastile are quite horrible enough for all practical purposes.

In ordinary life the French are a quiet, harmless people, and they are the last in the world whom you would suspect of

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atrocities; but every revolution in France has been full of horror, whether in past times or in the present. It has been said that you may take the mildest Frenchman in the world, give him a place of authority where his acts will not be called into question, and the chances are great that he will conduct himself in a very savage manner. I do not assert this of my own knowledge, but leave the reader to judge whether the history of the French prisons and French tyranny does not, in some degree at least, corroborate the statement.

The day after my arrival in Paris, a friend proposed that we should visit the Bastile. We were talking upon some topic, and I had actually stepped inside the carriage with him and given the order to the driver before it occurred to me that the Bastile did not exist, and had not existed for several scores of years. When I remembered this, and told my companion, he said, —

"I came very near selling you. I want to get even on selling myself."

Then he told me a story of his experience in searching for the Bastile. Bear in mind that he was an editor, familiar with history (editors of course *know* everything), and if he had given the subject a moment's thought it would have occurred to him that there was no Bastile in Paris worth mentioning. But let me tell his story as he told it.

"There were three of us who came over in the steamer, landed at Brest, and came to Paris. We arrived here in the evening. We put up at the Grand Hotel, and the next morning started out to 'do' the city. The first thing we saw as we stepped out of the hotel door to the Boulevard was an omnibus, on which was the sign '*Place de la Bastille.*' We mounted to the top of this omnibus, and away we rode down the Boulevard.

By and by we stopped near a large, open square, with a monument in the centre. The conductor motioned us to get down and said something which we did not understand, but which we mean that this was the end of his route. Moreover, the omnibus turned round, and we understood pretty well

eature eight round towers, connected by curtains of
nry, and was encircled by a ditch a hundred and twenty-
feet wide. This ditch was generally dry, and was sur-
ded on its outside by a wall sixty feet high, to which was
ched a wooden gallery running round the whole inner cir-
ference of the ditch opposite the castle. This gallery
called the "Rounds." Sentinels were stationed on these
nds, and it was their duty to be perpetually in motion, in
r to discover any movement of the prisoners for escap-
The Bastile had a governor and a staff of assistants,
it had a garrison of one hundred men, with their proper
ers.

henever a prisoner was brought to the Bastile, his trunks
clothing were carefully examined, in order to discover
ther he had any concealed papers or weapons. The ad-
ate Linguet, who had been detained there for three years,
—

The new comer is as much surprised as alarmed to find
self subjected to a personal examination by four men,
se appearance seems to belie their functions; men clad in
iforms, which leads one to look for a regard to decencies,
wearing decorations which presuppose a service which
ures no stain. This man takes from him his money, that
may have no means of corrupting any one of their num-
, his jewelry on the same consideration, his papers for
he should find any resource against the tedium to which
is henceforth devoted, and his knives and scissors are
en from him for fear he should commit suicide or assassi-
e his jailers."

fter this examination he was led to the cell intended for
to occupy. These cells were situated in all the towers.
e walls were at least twelve feet in thickness at the top,
at the base they were thirty or forty feet. Each cell had
mall window defended by three iron gratings, one within,
second without, and the third in the middle thickness of
masonry.

The bars of this grating were an inch thick. No fire was

allowed, and there was no glass in the windows, so that in winter these cells were like ice-houses, and in summer they were hot and damp.

The dungeons were nineteen feet below the level of the court-yard, and five below that of the ditch. They had no openings but a narrow loophole communicating with the ditch. The inhabitant of these dungeons was deprived of air and daylight, and lived in a damp and infected atmosphere. Oftentimes the floor of his cell was covered with mud, and he found himself surrounded by reptiles, rats, and other disagreeable creeping or walking things.

The written history of the Bastile shows that these horrible cells were frequently used for the confinement of prisoners in order to make their existence as terrible as possible. There is a tradition that iron cages were used for the confinement of prisoners, but writers who have given their attention to this subject say that nothing of the sort was discovered at the time the Bastile was destroyed. There is also a tradition in regard to the *Oubliettes*, which are described as holes into which condemned prisoners were lowered, where they should languish and die forgotten. There is also a tradition in regard to a Question Chamber, in which suspected prisoners were tortured to make them confess their guilt, or to reveal the names of their accomplices.

The Bastile could contain fifty state prisoners in solitary cells, and by putting two persons in one cell the number could be raised to a hundred. Sometimes as many as three hundred persons were in the Bastile at once, and in that case they were densely crowded. According to history the prisoners were wretchedly fed, but it should be said, in justice to the government, that this state of affairs was probably due to the frauds of the subordinates rather than to any intentional cruelty on the part of the government, as the latter generally made liberal allowances for the support of the prisoners in state. One writer asserts that in his time the governor of the Bastile had a great number of prisoners, many of whom were paid for at twenty-five francs a day, and that

to it. No man could be safe from imprisonment the
was subject to the whims and caprices of the m
state, whom no appeals could reach, and by whom
justice would be heard or heeded. If any man inc
displeasure of the minister, or of any one who had
influence to secure an order for his arrest under
seal, he might be taken to the Bastile at any mome
accuser desired that he should never more go ou
world, and never hold communication with any one,
ser's will became law. Hundreds of men were s
Bastile without knowing the cause of their arr
names of their accusers, and without being allow
municate with family or friend. It was this uncert
ever-present fear of injustice and cruelty, that
name of the Bastile appalling, and led every Fre
regard it as a place full of horrors.

It is said that some of the most barbarous cru
inflicted within the walls of the Bastile were during
of Louis XI. Louis himself was the author and
of some of the worst barbarities. It is recorded i
that he caused dungeons to be made in the Bastile s
with smooth and polished masonry, where the pris
were lowered into them, were obliged to remain in
ural position, which they could not change. Ac
history, the princes of the house of Armagnac we
in these horrible pits, and were drawn out twice
be scourged in the presence of the governor, an
every three months to have two of their teeth torn
jaws. Sometimes split sticks of dry wood were
their fingers, and then the sticks would be set o
allowed to consume. Richelieu sent many of his e
the Bastile, some of whom were treated with extrem
ation, while others endured great severity. One
men, the notorious Bassompierre, was immured the
years by the order of Richelieu.

One of the greatest mysteries attending the Bast
of the Man in the Iron Mask. A great deal has be

about him, some of it being fact, and some of it
Who he was is not positively known. It is very
hat he was a personage of great importance, whom
irable to keep out of the way, and at the same time
rable not to kill. He was always treated with the
sideration. Every one of his attendants uncovered
when in presence of the mysterious personage. His
was of the finest character, his food was of the best
nd served on the choicest table-ware. He was
alone, and then only in a place whence he could
: his face was always covered with a mask of black
stened behind his head with steel bands. His
overnor was De Saint Mars, and it is supposed that he
erable with his own life for the safety of the Man in
Mask, and for the preservation of his incognito.
t heard of he was confined in the Marguerite Islands,
editerranean. One day a fisherman, passing near the
his confinement, saw a hand wave towards him from
w, and a moment after, a silver plate was thrown out.
erman picked up the plate and looked at it; saw that
ords were engraved upon it, and immediately took it
governor of the prison. The governor looked at it
ly, and then asked the fisherman if he had shown it to
, or had read it. The fisherman answered, "No, your
ey, I have shown it to no one, and as for myself I
read."
t is fortunate," said the governor; and giving the fish-
gold piece, he dismissed him.
gold piece, however, did the fisherman very little good,
was assassinated that night by some unknown person.
y piece of linen, every scrap of paper, everything
in any way would convey information, was scrupulously
ted. One day the mysterious man made some writing
of his shirts which was going out to the wash. By some
this escaped the notice of the jailers, and was found by
isherwoman. She could not read, and when she re-
the linen, she called the attention of the governor to

writing. She was rewarded for her fidelity with a go ce, and she, like the fisherman, was assassinated on tl ght after she had obtained her reward. After this, the Ma the Iron Mask was always furnished with new linen ever ay, and that which he had worn was immediately destroye From the Marguerite Islands, he was moved to the Bastil where he died on the 19th of November, 1703. He was buric the next day in the cemetery of St. Paul, under the nam of Marchiatti.

In the Bastile he was waited upon at the table and at hi toilet by the governor, and no one else. He was allowed t go to mass, and a file of soldiers always accompanied him. Their muskets were loaded, and their matches were lighted: they were ordered to kill him instantly in case he spoke to any one, or attempted to tear off his mask. Who he was, and what he was, will probably never be known. No person of sufficient note to justify such precautions as were taken in his case was absent from the stage of history at that time. The general impression is, that he was an elder brother of Louis XIV., the fruit of an adulterous intrigue between Anne of Austria and the Duke of Buckingham, or some other of those lovers for which Anne was famous. As he was born in wed lock, he could not have been dispossessed of his claim to th throne, if his existence had been admitted. Louis XIV. m have had some absurd prejudice against murdering brother, though it was not the fashion of those days to b very fastidious. A story was written by Dumas under title of the Man in the Iron Mask, and it has been drama and given on the stage in Europe and America. The my which envelops the wearer of the mask gives an add interest to all stories concerning him.

In talking about this historic individual, we have alm gotten the Bastile. After the time of Louis XIV. the became a place of imprisonment, not alone of pe honorable birth, but of common malefactors, and of very low repute. The imprisonment of Beuzet, librarian, for obeying the king's own directions,

ON OF THE BASTILE, JULY 14, 1789.—ITS KEY PRESENTED BY
TO GEORGE WASHINGTON, AND NOW AMONG THE

...d thirty years in the Bastile; he appeared, on his ..., bewildered and half idiotic, like a man waking from ...of forty years, and looking out upon a new world. ...ds of the prison reveal many cases as bad as this, ...lover of liberty, even to the smallest degree, cannot ...at the Bastile has passed away forever.

XXV.

DIAMONDS AND DIAMOND MINES.

HOW DIAMONDS ARE OBTAINED. — THE COUNTRIES THAT PRODUCE THEM. MODES OF SEEKING THEM IN BRAZIL. — CURIOUS PRECAUTIONS AGAI THEFT. — HOW A SLAVE IN BORNEO ROBBED HIS EMPLOYER. — FAMO DIAMONDS AND THEIR HISTORY. — THE REGENT, THE ORLOFF, AND THE I HINOOR. — FIDELITY OF A SERVANT. — THE STAR OF THE SOUTH. — A SHA TRICK OF AN AMATEUR GAMBLER.

THE hardest known mineral in the world, and at the sa time the most valuable, is the diamond. It cannot be cut scratched by any other substance. In cutting the diamo another diamond, or the dust of one, must be used. T process of polishing these stones by rubbing two of them gether was probably known in Asia a great many years a but it was not introduced into Europe until the middle of fifteenth century. The diamond-cutters of Asia preser the secret of their work very carefully long after these able stones were brought to Europe. About the midd the fifteenth century, Louis Berquen, of Bruges, accide discovered that by rubbing two diamonds together, thei faces might be cut. The powder obtained in this way i for polishing the stone.

The diamond must first be dug from the earth, and only knew where to find them we could doubtless d richer gems than any of those now known. The earth contains the diamond is worked in the same way as th erous gravels, both having been produced by the same Gold occurs in the beds or streams, by the disintegra the rocks, in which it was originally contained, and the ual wearing and washing away. Diamonds were or contained in the rocks in the same way that gold was hel and the process of disintegration has been pretty m

lant overseer, they slowly wash away the sand and dirt, until nothing but pebbles remains.

The pick and shovel are used for breaking up the diamond-bearing gravels, just as they are used for breaking up earth which contains gold. The water carries away the clay, and sand, and fine dirt. The large stones are thrown out, and the finer gravel that remains is carefully picked over. It is examined in the sunshine, where the light plays upon the gems, and leads to their detection. The search for the diamond is always conducted under the eye of a superintendent, so as to guard against theft. Each diamond-seeker has a little case, made of reed, and generally ornamented on the outside. The small diamonds are placed in this case, and every negro who possesses a case which has once held diamonds is very unwilling to part with it. He regards it with a superstitious reverence, believing that when it once contains precious stones it will lead to the discovery of more.

The earth which has been gathered up for washing, if it is not worked immediately, is placed under a long shed, and when the rainy season begins, and water becomes abundant, the slaves are assembled for their duty. In the diamond district of Brazil the sheds are generally about thirty yards long, and half as wide. They consist simply of upright posts, and a thatched roof, erected over the spot where the heaps of gravel are placed. A stream of water is conducted through this shed. There is a range of sloping troughs, each about three feet wide, connecting with the streams at the upper end. Opposite the troughs there are high chairs, where the overseers are stationed.

A slave at each trough takes about a bushel or so of the gravel, and lets the water in slowly, in order to wash away the gravel and earthy particles. Then he throws out the largest stones, and examines the rest, with great care, for diamonds. Whenever he finds one, he stands upright, clasps his hands, holding the stone between his thumb and finger, and shows it to the overseer, who receives it.

a slave finds a stone exceeding seventeen and a half
weight, he is immediately set at liberty. Free
are given him, and he cannot again be enslaved.
y, on such occasions, a holiday or half-holiday is
to the negroes about the establishment. The lucky
carried on the shoulders of his comrades, and when
ends most of them are in a condition the reverse

diamond district of Brazil the diamonds were first
ed by gold miners, about the year 1730. At first they
norant of the value of the gems, and threw them away
s. Some of the stones were sent to the governor of
curiosities. He supposed that they were crystals,
accident a few were carried to Lisbon, where they
d to be shown to the Dutch consul. The consul was
nd sharp, and recognized the true character of the
He immediately caused them to be sent to Holland,
they were cut, and found to be of great value.
oon as the character of the stone became generally
, large quantities of them were gathered and sent from
, and at one time it seemed as if the diamond market
be ruined. The Portuguese government took means to
a monopoly of the trade. The diamond district was
nded by well-defined boundaries, which were guarded
the greatest care. No one was permitted to cross them
ut a permit from the superintendent of the mine, and
ever a traveller who had visited the diamond ground
leaving it, he was obliged to submit to a thorough ex-
tion of himself and baggage. So great was the vigilance,
it is said, at one time every traveller leaving the district
detained three days at the boundary, and was compelled
allow medicines whose effect was to prevent his abscond-
with any precious stones concealed in his stomach.
peculiar system was established for the regulation of this
ict. Stringent laws were passed to provide for the regis-
g of the inhabitants, the admission of settlers, and the
ment of infringements of every kind upon the govern-

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It was afterwards worn in the helmet of Henry V., at the battle of Agincourt, in the year 1415.

The crown jewels of France disappeared in 1792, during the troubles of the first republic, though they were kept under seal, and in the royal treasury. Some of them were afterwards found buried in an obscure place, which was named in an anonymous letter sent to the prime minister. The famous Regent diamond was in this casket.

The Regent diamond is probably the finest and best cut one in the world, though it is not the largest. It was named for the Duke of Orleans, who was regent during the minority of Louis XV. The regent bought it, in 1717, for one hundred and thirty-five thousand pounds sterling. It was sold to him by Governor Pitt, who paid twelve thousand five hundred pounds for it in India five years before. Its weight before cutting was four hundred and ten carats, and the process of cutting occupied two years. Its weight was reduced to one hundred and thirty-six carats, and its present value is estimated at a million dollars.

Pitt was an unhappy man during the five years he owned the stone. He carried it with him constantly. He never made known his movements a day beforehand, nor slept for two nights successively in the same house.

Another diamond, quite famous in its way, is the "Sancy." It fell from the helmet of Charles the Bold at the battle of Granson, and was picked up by a Swiss soldier. The soldier disposed of it for two francs, and thought he had made a very good bargain. In 1589 it was bought by De Sancy, treasurer to Henry IV. of France. In 1792 it was stolen, and after various adventures, was bought, forty years afterwards, by Prince Demidoff, who paid for it seventy-five thousand pounds. It has since been sold for a much smaller sum.

A few years ago a diamond was found in Brazil, and imported into France under the name of the Star of the South. It was found by a negress, and bought for a few dollars by a speculator, who obtained a large return for his investment. Its weight in the rough was two hundred and fifty-four carats; after cutting, it was one hundred and twenty-four carats.

Another famous stone, known as the Grand Duke of Tuscany, is of a yellow color, and weighs one hundred and forty carats.

It was lost at one time, and bought subsequently, it is said, for a few francs, out of a jeweller's shop at Florence, the jeweller supposing that it was only a piece of colored crystal.

A famous diamond in Russia is the Orloff. It is shaped like an egg, with an indented hollow in the smaller end. It was found at Landak, in India, and at one time formed the eye of an idol in a Brahmin temple at Pondicherry. An enterprising deserter from the French army managed to have himself shut up in the temple, and during his incarceration he gouged out this eye of the idol. He attempted to capture the other eye, but was unsuccessful. He was lucky enough to get away with his prize, which he sold to a jeweller at Calcutta. After passing through the hands of various purchasers, it was bought by a Greek merchant, who sold it to the Empress Catharine for four hundred and fifty thousand dollars, and an annuity of twenty thousand dollars, with a title of nobility.

One of the best known, and probably the most famous, diamonds in the world is the Kohinoor. It is interesting for the great number of historical associations connected with it. It is said to have been worn by an Indian king three thousand years before the Christian era. From this king the Kohinoor passed through the hands of successive sovereigns of Central India, until about the beginning of the fourteenth century, when it was added to the treasures of Delhi by the Persian monarch Aladdin. In 1739 the Persian monarch Nadir conquered Delhi, and had an interview with its vanquished ruler. The latter put on his best garments in order to make as good an impression as possible. He wrapped a gorgeous turban around his head, and in it he fastened the Kohinoor.

The Persian conqueror, during the progress of the interview, saw this diamond, and, in the expressive language of modern days, "went for it."

He was too polite to capture it by main force, but proposed eternal peace and friendship to Mohammed Shah, and

r of Delhi. The latter, like Barkis, was willin', embraced.

son of our friendship," said Nadir, "let us ex-ans." Mohammed was cornered and obliged to Nadir walked off with the prize. But Nadir did long, as he was assassinated soon after.

death it passed to the hands of Ahmed Shah of thence through various other hands, until in 1849, the annexation of the Punjaub to the East India territory, it was stipulated that the Kohinoor should the Queen of England. It was sent to England, ered to the queen July 3, 1850. It was exhib-Crystal Palace in London, but caused great disap-by its inability to develop the proper refraction, aided by strong lights; in fact, it was much in-glass model in the Tower. Its name, Mountain of ed to be a misnomer.

mination was made with a view to recutting it. gentlemen were called in, and skilful cutters at a were sent for. After much consultation, it was to recut the stone. The proper machinery was and set up, and the Duke of Wellington was re-begin the work.

ng a diamond, the stone is firmly embedded in lead of a stick. Only the portion which is intended is exposed at one time. The Kohinoor was fixed in its leaden surrounding, and placed in of the duke. He held it firmly against a swiftly wheel covered with diamond dust, and in a little first facet was finished. Then the stone was placed ds of the workmen who were to continue the oper-n when their labors were completed, the Kohinoor d blazing brilliantly, and justified its title as the of Light.

rest and most valuable diamond in the world, so far is presumed to be the one so long owned by the Rao, Borneo. It weighs three hundred and sixty-

ring was genuine, and offered to back his opinion with a
of a hundred dollars. The bet was taken, and it was ag
that Jones, Smith, and a person selected by the two, shoul
together to the prominent jewellers and ascertain the v
of the ring.

Next day they visited the stores, and jeweller after jew
examined the stone, and pronounced it genuine, and w
four or five hundred dollars. Most of them were ready to
four hundred dollars for it.

The bet was paid, and Jones departed to drive with a fri
up town; but on his way he called at the jeweller's, exchan
the genuine stone for the paste, obtained his five hund
dollars he had left on deposit, paid for the use of the diam
and slipped away.

That evening he was again at the gambling-house, and ral
Smith on having sold himself. Smith acknowledged that
had been deceived, but he never supposed the ring was w
anything, and was surprised to find that the stone was genu

"Well," said Jones, "I don't wish to take any mean ad
tage of your stakes; you staked that ring for a hundred do
and the jewellers said it is worth four or five hundred d
For a hundred dollars, the amount of your stake, yo
have it back again.

Smith bit at the offer, paid the hundred dollars, and r
the ring. Jones departed, and did not return. Imag
disgust of Smith when he subsequently found out
state of affairs.

Unfortunately for the miners at the Cape, there is a very short supply of water. If they could have adopted the system of hydraulic mining to their work, they would have saved enormous labor and expense. At many of the fields which are distant from the rivers, the gravel is removed by means of buckets, drawn up by long ropes, and it very often happens that a single heavy rain of a few hours, will destroy the entire labor of months, the pit becomes filled with water, and there will be no way of extracting it except by evaporation, or by the laborious process of hoisting or pumping. One of the fields, known as Colesberg Koppje, fell off, in one year, more than fifty per cent. from the yield of previous years, in consequence of the heavy caving and floodings caused by the rains. The value of claims in that region has gradually fallen, and so desperate is the condition that, at last accounts, money was loaned upon mining licenses at the rate of ten per cent. a month, with a foreclosure at the end of the first month if the interest was not paid.

At the diamond camp, the small stones form the basis of value. They might be used for currency except for one fact. Gold dust, in California, was used for currency, for a long time. Its value, of course, is directly proportioned to its weight, a pound nugget being worth exactly twelve times as much as an ounce nugget of the same fineness, but the value of diamonds increases with enormous rapidity as they grow heavier, so they cannot be put in bunch or weighed out the same as gold. Transactions frequently take place in diamonds, and the amount of exchange is often very difficult to compute.

The last region of which we have any account is known as Kimberley, and a city of ten thousand inhabitants, with banks, hotels, churches, and theaters, has grown up there. In its general features, it is not unlike a frontier city in California or Colorado, except that its streets are filled with carts carrying earth away from the diggings, and with great numbers of negroes who come to work in the mines. The diamonds are found in a conglomerate which is dug up from the bottom

of what has once been a deep cañon. At Kimberley, the cañon is two hundred feet deep, and one thousand feet across. When one descends into this place, it is almost impossible to hear the human voice, on account of the noise made by the wheels and buckets, and the picks, shovels, and other tools of the miners. In the early times of the mining excitement at the Cape, the negroes were reasonably honest, but association with the white man has made them otherwise. When they can steal the diamonds they do so. They will secrete them in their ears, their mouths, or their noses, and a negro has been known to work an entire day with two or three diamonds concealed between his toes.

An interesting story is told of how an Englishman lost, one day, a valuable diamond, through his impetuosity. He had found a very large and fine stone at the bottom of his pit, and was coming up the ladder, carrying the diamond in his mouth. A negro happened to shake the top of the ladder, whereupon the Englishman proceeded to swear at him, as an Englishman might be expected to do. The result was, the diamond fell from his mouth down into the pit or into a neighboring one, and its whereabouts was never discovered by the unlucky finder. We have heard of mouths that speak pearls, but it is rarely the case that one hears of a mouth swearing diamonds.

In the early days at the diamond mines, there was a good deal of rioting and trouble. There was not much observance of law, mainly for the reason that there was no law. But at present, every thing is orderly and peaceable. The diamond fields are partly in regions controlled by the British government, and partly in the Republic of the Orange Free State. The latter country became known to many Americans through the Centennial Exhibition at Philadelphia, in 1876. It had a small display, but a very attractive one. First and foremost, of course, were the diamonds in the rough, which included many specimens of stones, varying in color and size. There came a quantity of the soil in which the gems are found, then the pebbles which accompany the diamonds. Copper, iron, and other ores were exhibited; many excellent spec-

is neglected. About an hour after, he was inside, bu decorating its walls with red tape, when a sudden and viole whirlwind swept off the claims in all its dusty majesty, a careering down the road, encountered the unfortunate ter A moment more, it rose in the air like a balloon, the astound tent-maker vainly hanging to its ribs, until, seeing it was bou to go up, he dropped out, like an apple from a tree. Up went, whirling with frightful velocity, and pursuing the cour of the road, until it knocked fiercely against the gable of neighboring canteen. In went the roof, while out came th inmates, amidst the smash of bottles and the running c brandy. On and on, and round and round, went the tent until, espying a jaunty little canvas house which defied win and rain, in a fit of jealousy it went into it, and, with a gran smash, both lay in ribbons on the ground, while the disgusted tent-maker settled a bill for two ruined houses, instead o being paid for erecting one.

"During the summer months, rain-storms, with heavy thun der and lightning, are frequent. They generally approac with a violent breeze, sharp lightning, and loud thunder. T clouds are all in motion, crossing and meeting each oth while along the face of the nimbus, or storm-cloud, is a he gray pall of vapor. This is much lower than the rain-cl and when close to the earth, portends a fearful storm. gathering blackness, increased by clouds of dust, the zi lightning, the hoarse, reverberating sound of the thunde the moaning wind, all strike the spectator with awe gazes around him out on the distant plain, where all is and somber; at the immense gray mounds of the deserted, and looking ghostly and unearthly again pitchy background—and the storm is upon us. Some rain-drops strike the tent, a flash of lightning blinds, thunder stuns, and the gates of heaven open. The tempest drowns all other sound, the tent shakes an beneath the blast, while rivers of water course dow cutting great gullies in the road, and quickly any protective earth-work the digger has place

canvas begins to leak, and the inmates of the tent dripping silent, listening to the war of the elements. ht, our Caffres were drowned out by one of these heavy They generally slept in a large, circular fire-place of t deep, just sufficient to keep the cold from them, and e snugly ensconced when it began to rain. Above place was a hollow which drained into it. As this was very unpleasant, and often, in heavy rains, out the fire, we built a dam against it as a protection. ight in question, it rained so fast the hollow was soon of water, which pressed with such force against the it gave way. In an instant, the fire-place was full owing, and the Caffres, thus rudely awakened, gave ty yell as the waters covered them. Aroused by the peeped forth as they were struggling out, their black howing around the edge of the fire-place like those of hippopotami. After getting out, and giving some shakes, they commenced fishing up their bed-clothes he treacherous flood. Long before sunrise, next morn-oy were at the tent door, calling loudly for 'soupies,' or re denominate 'eye-openers,' and certainly their condi-ter what they had gone through, demanded relief."

ne of the stories told about the diamond finds are decid-attractive. Some of the earlier miners made large es in a short time. They had nothing to pay for their d, and found from one to twenty diamonds every day. the price of claims went up, they sold out, anywhere wo to ten thousand dollars, and went home. One man ifty thousand dollars in a month, divided his claim into ts, sold each part for one thousand five hundred dollars, nt away satisfied. A ship was wrecked on the coast. ptain, of course, was a very unfortunate man. Not g what to do, he went to the diamond fields, where he hree months, and went away with seventy-five thousand

A Dutch Boer found, in one day, thirty-one diamonds, weighed respectively thirty-three carats, eighteen, fif-ne, seven and a half, and other smaller ones. He

XXVII.

THE UNDER-WORLD OF PARIS

IMMORALITY AND LICENTIOUSNESS OF THE CAPITAL. — COMPARISON WITH
THER CITIES. — FRENCH ETHICS AND LITERATURE — DIFFERENT GRADES
THE DEMI-MONDE. — THE TRUE STORY OF CAMILLE. — THE GARDENS ON THE
SE — THE DANCES AND THE DANCERS. — THE PETITS SOUPERS OF THE CO-
TTES — AFTER-MIDNIGHT SCENES. — ACTRESSES AND CHAMPAGNE. — AD-
TURESSE AND CHATEAU MARGAUX. — INTERIOR OF A THIEF'S DEN AND
PARER'S CELLAR — BLOODTHIRSTY VIRAGOES AND DESPERATE CUT-
OATS.

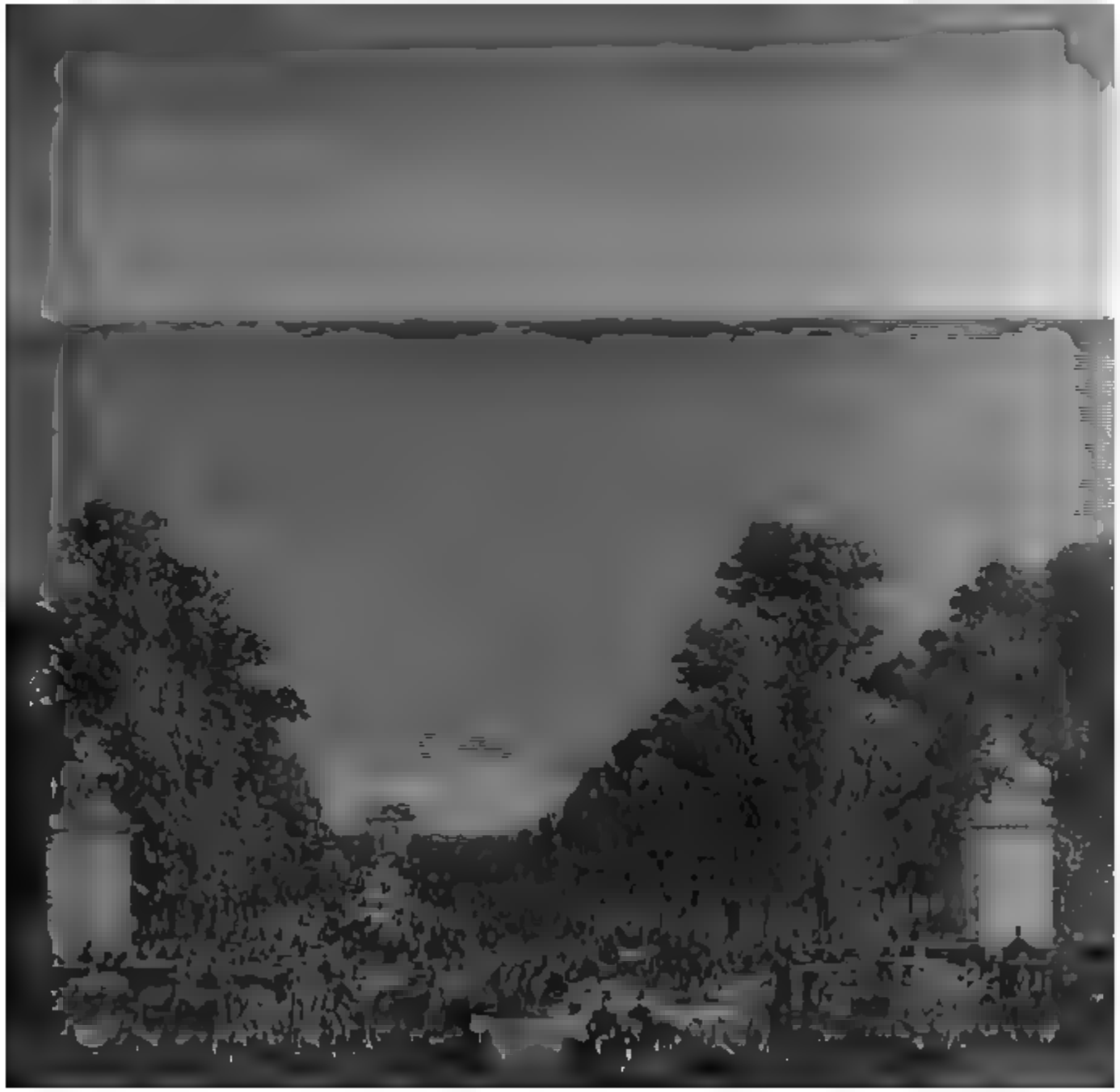
demi-monde is aptly named; for, while it is so-
ntly worldly, the world rejects it, and in most instances
to be unconscious of its existence. In the French
it is accepted as a fact, and it can hardly be any more
rous there on that account, than it is in cities where it
nored. The French have gained the reputation, but
any good reason, of being much more immoral than
nations. We Americans are constantly asserting this,
iteration has had the effect, no doubt, of inducing us
ve that we are a great deal better than they. Our as-
s are unquestionably loftier, and we are more anx-
hide our defects; but that we have fewer vices,
side our pretences, and stripping off our shams, must
hastily admitted. It is to the disadvantage of the
ls that on many subjects they are inclined to say
think, while we are disposed to think what we do
hey, too, take human nature as they find it, as it has
e first; having no expectation of changing it by
p on one side, and giving it free vent on the
ors are not at all squeamish or puritanical, and

are addicted to the treatment of themes which we d only in private. The cities of France, notably Paris, robe themselves in external sanctity, careless of the quality of their ethical raiment, and, on account of their ness of speech and deportment, they are gravely misju

Paris is bad enough, Heaven knows; but that it is the edest city on the globe, as is frequently asserted, mu taken with large grains of allowance. The wickedest ol are numerous. Not only has Paris that reputatio Vienna, Naples, St. Petersburg, Berlin, London, New have it also. Even Boston, the centre of the land of habits and high moral ideas, is pronounced by many pe who know it intimately, as unequalled for private prof Stockholm, in the far and frozen north, where the tempe might be fancied to freeze the evil passions before they have full play, has often been declared more immora Paris, Naples, Vienna, or London. In proportion to th ulation, there are more illegitimate children born in holm, it is said, than in any other capital of Europe; marriage is held to be the best and purest condition c and women, this extraordinary extent of illegitimacy m interpreted to the Swedish city's discredit.

It is all folly to arraign any particular community as than another. Communities are like the individual make them up. This has certain defects which that h Circumstances and conditions produce different resu different places; but, on the whole, mankind, when thor understood, will be found very similar in most of the c of civilization.

As Paris is acknowledged to be the capital of gaye pleasure, and as morals are left there to take their n course rather than to be hampered without benefit, Paris best place to observe human nature in its disapprove tions. The demi-monde is opposed to the grand-mond ought to represent, therefore, not only women of a pe class, but the members of both sexes whom society, a expression of conventionality, refuses to acknowledge.



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ode, in this sense, means the under-world, nowhere so
ing a study as on the Seine.
ardly, the French capital is most decorous. Vice
like virtue because it is relieved of grossness; even
softened and rounded with grace. You do not see
in London or New York, repulsive and revolting
You do not encounter drunken and disgusting men.
not hear women, who have unsexed themselves, in-
in coarseness and profanity in the public thoroughfares.
where else in fact. Everybody and everything appears
er that inexperienced and innocent souls have ex-
their astonishment at the ill fame the city has
, and have concluded that its bad name is undeserved.
ding on the Boulevards or riding on the Champs
they are unable to distinguish the Faubourg St.
from the Quartier Latin — the upper-world from the
-world.
estimated that more than fifty thousand of the women
s live in a state of concubinage, which, in a population
millions, is something enormous. The proportion is
ng, but more from the facility attained there for pro-
statistics than from the fact itself. Actualities,
er painful or not, are known and recorded in that cap-
stead of being unsuspected, as they are likely to be
here. This vast number of unchaste women are by no
professional courtesans, — probably five thousand would
e all of these, — but embrace half a dozen grades of
relations.
causes that contribute to prostitution in France are,
he unwillingness of men of education and position to
girls who are poor, and can therefore have no marriage
n. Wedlock among the Parisians is far less sentimen-
romantic than it is with us. It a species of one-sided
nt and partnership, in which the wife is expected to
il, and the husband to do as he pleases. He cares less
mpathy and affinity than he would if he did not expect
them outside of the domestic circle. He marries

generally for practical reasons; because it will benefit socially, or be of substantial advantage. In consequenc this, young women in humble circumstances are little li to be wedded. They have hearts if they have not inco and when their affections are enlisted, they listen to the v of Nature without waiting for the sanction of the priest. not the custom, either, in France for men or women to wed of their station, though love or passion does not respect s lines or distinctions in that country more than in any ot Hence it may be seen that unwedded wives must be nur ous in Paris.

Another cause is the draft that the army makes upon young men of the country. Compelled to enter the milit service before they are married, their habits are such, a they have remained in the army the allotted time, as do conduce to matrimony. The whole land is drained for sake of steel-and-gunpowder parade. Thousands and tens thousands of people who have no interest whatever in, are only made the worse for, war, are compelled to furnish sinews at a ruinous cost to themselves.

Still another cause is the number of illegitimate child who, regarded as the children of the state, are reared educated by the state, and at a certain age are left to prov for themselves. Many of the young men seek milit service, while the young women, for the most part, bec what their mothers have been before them. Their tastes their ideas are superior to their rank. They are unwillin look for husbands in a lower grade, and cannot secure t in a higher. Gallants and lovers, however, are abundant persevering, and under the circumstances seldom woo in v France, moreover, tolerates, if it does not encourage, relat that other countries raise their hands in holy horror at. does not act on the conviction that the absence of one vi expels all the other virtues; it refuses to brand and ostra a woman because she has merely been unfortunate, o make her responsible for the wrong she has sustained at hands of man. France, it must be admitted, is juste

omen than other nations are, for it gives them an opportunity be independent and advance themselves, even though they ve committed what we might regard as the unpardonable sin. The first circle of the demi-monde in Paris and other nch cities, though it is not so called, includes the educated d rather refined women I have mentioned, who from poverty, dependence, or want of fixed position, cannot marry in rank to which they properly belong. Their antecedents their destiny, and they hardly regard the relation they ve been accustomed to consider inevitable as they would gard it had they been differently trained, and had the ethics the nation been less liberal.

The second circle is represented largely by the grisettes. ny of them marry, and live domestically all their lives. many others have a gay and coquettish disposition, prefer vers to husbands, excitement to routine, display to conventionality, and the exhilarations of to-day to the serenities of morrow. These are truly of the half world, for they are lf married, and yet wholly independent. They live with their masculine friends, take care of their apartments; are their companions at concerts, balls, and theatres, in the evening; and yet they have their regular daily duties at the shops where they are employed. They are not isolated; they have society of their own; are contented, cheerful, and often enjoy themselves better than the women who have been honored by wedlock.

The most showy and best defined type of the demi-monde is the adventuress, who is the popular representative of the entire class. The French playwrights have delineated her fully, and made her familiar to everybody. "Camille," and "The Marble Heart," have heroines of this sort. The former drama treats her sentimentally, and the latter cynically. She is not so generous and self-sacrificing as Camille, nor so selfish and sordid as Marco. After Alexandre Dumas wrote "Camille," and achieved such astonishing success, another Parisian *littérateur* composed "The Marble Heart" as an offset to it, declaring Marco to be the real, instead of the ideal lorette.

The story of "Camille," or "La Dame aux Camelias," as it is termed in the original, is founded very largely on fact. The central figure of Dumas' pathetic drama had genuine existence. Her name was Marie Duplessis. She was as lovely in person and as elegant in manner as she is portrayed on the stage. Indeed, the theatric picture was almost a photograph, and the incidents of Marie's life have been closely followed. The Armand was a young and excessively romantic physician, who, having met the beautiful cocotte at an opera ball, fell so desperately in love with her that he wished to make her his wife. She had too much good sense and prudence, independent of feeling, to permit such a sacrifice; but his devotion and generosity touched her nearly, and soon awoke an answering passion. In spite of her errors, she seems to have been intrinsically a fine and noble woman, who, under favorable circumstances, might have been pure and true. So much was she impressed by his chivalry that she cast off her admirers, purchased a handsome villa near Versailles, and begged her new lover to share it with her. He did so; for he was infatuated with Marie, and would not listen to the sober counsels of his family and friends. His father, in very moderate circumstances, was sorely troubled at the conduct of his son, who had no thought nor care for anything but his mistress. The old gentleman, unable to influence the headstrong boy, sought an interview with the lady of the camellias, and begged her to break off the connection. She undertook the task, and succeeded where his family had failed. Her success, however, was obtained at the expense of truth and her own heart; for she made her lover believe that her attachment to him was waning.

Armand, with all the gloom of the Inferno weighing upon his spirits, went to Italy, trusting that absence and travel would enable him to forget the woman he now deemed unworthy of him. He was gone a twelvemonth. He bore separation much better than she, as men usually do. Before half that time the charming lorette fell ill and died. The doctors asserted that her ailment was consumption, but the poets in-

ed it was a clear case of broken heart. Her death, with previous history and romantic reformation, moved the gaiety and appealed to the sentiment of Paris, especially as the tale had been told in gushing style, and in any number of short paragraphs in one of the gossipping journals.

When the villa at Versailles was advertised for sale, with its elegant furniture and dainty articles of virtu, a crowd gathered, and the bidding was so spirited by reason of active competition, that everything brought nearly double its actual value. Dumas, then quite young, was present, and secured, as memorial, a handsome ring which Marie had worn.

Six months after, some one called at Dumas' house to see him personally. The author found the stranger to be a pale and melancholy young man, who said he had come with the hope of buying the ring that had been purchased at the sale. Further conversation revealed the fact that the stranger had been Marie's lover, that he had given her the ring; and now, overwhelmed by the news of her death, of which he had just been apprised, he begged, as a special favor, that he might be permitted to purchase what to him had such inestimable value.

Dumas, deeply touched by the story, insisted upon making a present of the trinket to the bereaved youth, and afterwards wrote out the tender tale which has since drawn tears from half the world.

The adventuress is usually favored by nature, and carries her fair face and symmetrical form to the best market. If not handsome, she is winning, has great *chic*, clear insight, thorough understanding, and the weaknesses of our common humanity.

Good and kind at first, she has become what man has made of her; and in the vocation she has chosen, vanity and self are her impelling powers. Her beauty is a commodity she offers to the highest bidder. She receives large sums, but she squanders them recklessly; for display is almost the only passion of her being. She shines in the Bois; bets desperately at Baden; turns heads at Vienna; shocks the proprie-

ties of London; dashes resplendent along the Nevski, in the height of the gayeties of Petersburg; creates a sensation at Florence; astonishes the staid Germans at Berlin; interrupts the opera at Madrid; and finally, furnishes the subject of a letter for the New York Herald.

Her career is necessarily brief, for her reign must end when years begin to tell. Between twenty and thirty-five her golden harvest must be gathered. Not unfrequently she dies by her own hand; but oftener she has learned prudence ere her charms have waned, and is contrite when it is no longer easy or graceful to sin. It is a great mistake to suppose that the adventuress is invariably drawn out of the Seine, and exposed at the Morgue. No longer able to repeat her triumphs, she likes to withdraw from Paris, in some retired town seek the consolations of religion, and bestow charity upon the poor. She is more interesting at forty than in the flush of her glowing youth; since then the flame of her self-love has been allowed to smoulder, and the radiance of her true womanhood returns once more.

The fourth circle of the demi-monde are those priestesses of Venus who sin without satisfaction, and laugh without gayety. They are not materially different in Paris from what they are in other cities. They have gone down by slippery and sable steps, but not to a level with despair. They do not despair and live, in the air of France; for with despair comes the pan of charcoal. They have intervals akin to cheerfulness, and highly-spiced sensations bounding from pleasure to delirium. They need not cease to hope or fear, since there is still a deeper deep; and that is the fifth circle, whose representatives frequent the streets at night, the cheaper cafés, and the common gardens, in search of means to continue in their horrid trade. Even these are not so degraded as the same kind of unfortunates are with us. They do not drink: they do not swear; they do not importune strangers rudely; they do not from the first disgust in their effort to attract. They have apartments of their own, a certain kind of society and a species of freedom that women, however fallen, always

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ASTOR, LENOX
TILDEN FOUNDATIONS

...y in France. They are not labelled outcasts, as in Eng-...d and America, and therefore, in their darkest hours, they ...e glimpses of the heaven of hope. Careless and improvi-...t as they are in their youth, they frequently provide for ... future as years go on, and come to their end through con-...sion and ecclesiastical forgiveness of all their transgres-...ons.

The sixth class, the lowest and last of the semi-mundanes, ...e more nearly pariahs than any others of their kind. They ...ely make any provision for to-morrow, since to-morrow is as ...small and as painful as to-day. Almost always in want, their ...astefulness is such that they would be poor if every month ...ere marked by a shower of gold. It is they who accost ...rangers at night on the Boulevards; ask loungers in the ...fés to buy coffee and wine for them; make *poses* and smoke ...igars in the streets; and are sometimes arrested for brawls ...intoxication, and pilfering. When they have reached this ...rade of degradation they cannot go back; they cannot stand ...ill; they cannot fall lower. They put formidable obstacles ...n their proper path, and are their own worst enemies. Such ...lasticity and endurance as they may have is soon spent. ...efore a great while, a damp cellar or dingy garret is broken ...pen, a suffocating odor is perceived, the rude bed holds a ...rpse: a brazier of charcoal tells the story, and adds ...other to the countless tragedies which invariably keep the ...ance with life.

The gardens of Paris, like the Mabille, the Closerie de ..., the Chateâu Rouge, and many others reveal another ...ure of the under-world. The Mabille, to which strangers ...rally go, is the least indecorous, and, I may add, the dull-... There half a dozen couples, the women being generally ... lowest demi-monde class, are paid so much per night ...ncing of the most extraordinary sort. What it lacks in ...cy is made up in energy. The greatest ambition of the ...es is to kick the hats from the heads of their partners, ... throw their drapery into the wildest confusion. Their ...ents belong rather to gymnastics than the quadrille,

...ntement as the music of Offenbach pours out under ... to infect them with its sensuous frenzy. Doubtless ...dents and their lemans enjoy themselves to the ut... for they could not counterfeit enjoyment so excellently, ...moke, and drink, and laugh, and talk, and chat and ...ogether without the smallest reserve or restraint, as ...had not, and never would have, any other thought than ...resent moment and its absorbing pleasure.

...n the weather is unfavorable, they have their balls in ..., covered space, and to see and hear them leaping, ...g, screaming, and roaring in one confused and palpi... mass, impresses the self-contained and impassive Anglo... very strangely. Those French revellers have few ...ments. They do their wooing in the presence of ...ds: they have their little quarrels in the midst of their ...l of glee. Elise appeals to Jacques with shrugs and ...and streaming eyes; and Victoire complains of neglect, ...mphasizes his jealousy to Marguerite before the giddy ..., as if they were in the privacy of their own apart... They make up their differences with petting words ...opious caresses, and enact their melodramas regardless ...ious eyes and smiling lookers-on.

...re are resorts, and not a few, in Paris, of a more private ...ter, where decorum is not observed, and where restraint ...practised. All evil passions are there let loose, and vices ...ed that would be repulsive to any but morbid minds. ...shameful entertainments are declared to be in imitation ...ient Grecian revels and Roman rites. The claim is note...y, for Paris, in its most revolting and secret sins, never ...s to assure itself and the external world that such en...nments are sanctioned by classicism. These may be ...ned: they certainly cannot be described.

...e *petits soupers* of the under-world are reckoned by ... among the attractions of the French capital. They ...r at many of the restaurants, though at Peter's and the ...Helder they are given with the most flavor. These little ...ers begin after midnight, and continue until dawn, and

though the best of them are private, the public ones, or rather those in public places, have enticements for the masculine mind, on account of the eccentric women to be found at them. At Peter's and the Café Helder are spacious saloons, provided with small tables; and about one o'clock in the morning, parties of gayly-dressed ladies, with their gallants, and often without gallants, begin to arrive. Many come in carriages, but some on foot, albeit the pedestrians are attired like stage queens. The majority of the women are lorettes, of different grades, but not a few of them are the inferior actresses of the Gaîté, Variétés, and Gymnase, and the ballet girls of the Vaudeville, Ambigu, and Folies Dramatiques. There they completely unbend, cast reserve to the breezes, take easy positions, chatter like magpies, blow small clouds of smoke at the frescoed ceiling, or keep time to the clinking of champagne glasses with their symmetrical feet. Those unescorted are entirely willing to be invited to partake of salads, ices, or wines by the gentlemen who drop in from mere curiosity, or from a desire to make feminine acquaintances.

Between two and three o'clock the sexes become adjusted to each other; everybody is eating and talking, drinking and smoking, at the same time. The handsome rooms resound with feasting and merriment. Glasses rattle, forks clatter, tongues wag, songs are sung, toasts given amid the highest glee and enthusiasm.

Standing in a chair, with a beaker of sparkling Clicquot, is the pretty soubrette of the Gymnase, making a mock-heroic speech; and at the end of every sentence she is greeted with the clapping of hands and loud huzzas. Near her the graceful danseuse of the Folies, encircled by the arms of the dramatic critic of the *Figaro*, is offering a toast in a goblet of Château Margaux, and at the other end of the saloon, two brunette deities are giving a bit of the can-can, in the midst of vociferous cheering.

Stretched on a velvet sofa, her heels elevated above her head, Marie Basquinette, a famous adventuress, who has just

come from London, is entertaining her listeners with a droll account of the awkwardnesses and stupidities of the English. (Whenever the French wish to be particularly funny, they always caricature John Bull; and many of them really believe that no Briton can, by any possibility, appear other than uncouth and ridiculous.)

The French prints of well-dressed carousals with which we are so familiar, might be actual photographs of the *petits soupers* and their surroundings at the Café Helder. As the night wanes apace, and as the east grows gray, the revellers begin to disappear. There is something ghastly in the daylight surprise after a debauch, and the Parisians flee from it as if it brought sermons and endless prayers.

What we should call the dangerous classes would seem, from the fair outside of Paris, to have no existence there; and yet, as the police well know, many of the most cunning thieves, audacious burglars, and desperate scoundrels are native and to the manner born. They keep out of sight by day, and are rarely seen in the fashionable quarters, unless they have some special mission of villany. These fellows have their organizations and their amusements, and herd together and hold nocturnal revel in out-of-the-way dens, where no one but the gendarme or government spy would think of looking for them.

Having some desire to become acquainted externally with French scoundrels, I mentioned my desire to a private detective, who promised to take me to the district known as the Batignolles, where, he said, many of the choicest miscreants of the city were in the habit of assembling on Sunday nights. He told me that, while there was not likely to be trouble or danger, it would be well to be armed; and so, with two revolvers each, we sprang into a calèche, one stormy Sunday evening, at the Grand Hôtel, and drove to our point of destination.

After nearly an hour's ride through narrow and dreary streets, over rough pavements, and past malodorous neighborhoods, he stopped before a tall stone building, that looked like a deserted mill.

Not a light was visible anywhere, and, as the night was dark, I asked my guide if he were not mistaken in the locality. He assured me that he was not, and, taking my hand, told me he would lead the way. I could see nothing; but after we had stumbled along for a few seconds, a flash of lightning revealed a long, narrow stone staircase before us, and down this we slowly crept. At the base was a heavy oaken door, which appeared as if it might withstand a battering-ram, and I was wondering how we were to open it, when the detective put his mouth to the key-hole, and gave a peculiar whistle. The door swung open at once; we stepped into a dismal vestibule, and were confronted by a huge figure, who grunted out, "*Tout bien*," as he recognized my companion, slammed to the door, and bolted it securely. So large a Frenchman I had hardly seen. He was a giant in proportions, and I discovered by a few phrases, that he was an Alsatian. He knew what we wanted, and told us, pointing in the direction, to go to the main hall, where, to translate him freely, the boys were very lively, and having a good time.

A few steps brought us to the hall, — it should have been called a cellar, — and in it were some fifty of the most villanous-looking men and coarsest women I had ever had the misfortune to encounter. It was evident, at a glance, that they were thieves, robbers, and assassins; the slightest acquaintance with phrenology and physiognomy made that clear — that some of them were of the sneak, some of the burglar, and others of the desperado order. The place was dimly lighted with a few sputtering candles; the ceiling was low, and the air mephitic. A few of the men were standing and smoking pipes; but the greater part sat at rough tables drinking and talking in hoarse tones, with vile oaths, on subjects in which it was natural they should be interested.

A murder that had been committed a fortnight before in Marseilles, an account of which had been printed in the Paris journals, occupied much of their attention. They were very laudatory of the skilful manner in which the crime had been perpetrated, and of the adroitness displayed by the criminal in

crimes. They continued, however, to discuss the exploits of the members of their profession, and to express the warmest admiration for the greatest scoundrels. It hardly seemed possible that human beings could be so hardened and so vicious, and that they could find their chief gratification in disorder, violation of law, and revolting iniquity. These fellows were more like brutes than men in semblance. Their eyes had a fierce and lurid expression; their mouths were sensual and coarse; their jaws had a heavy, animal-like firmness; and their whole faces were dark and forbidding. I noticed that many of them drank spirits, which is uncommon in France, and that the largest potations did not sensibly affect them.

Three or four of the gang were so repulsive in feature that I felt a curiosity respecting their history, and made inquiry thereabout of the detective.

"That chap sitting down with the short pipe in his mouth," said the legal bloodhound, "is not more than thirty years old, though he looks nearly fifty. He was born and reared in or near this city, and has been a thief since his earliest childhood. His father was a noted burglar, and died in prison at Bordeaux, where he had been arrested for an attempt to break into the vault of a bank. The man's name is Pierre Boudrot; but he is called by his associates the Mad Bull, from his great strength and violent temper. Until he was fifteen or sixteen, he was a petty pilferer; but he afterwards aspired to highway robbery outside the barrières. He prospered in this for some time; but having, as it was suspected, shot and killed a merchant, he was forced to fly to England. Returning three years after, he was apprehended and tried for the crime. No direct evidence could be adduced against him, and he was acquitted. He has been involved in any number of personal encounters with his fellow-villains, and has stabbed and shot at least a dozen of them. Generally speaking, they have refused to testify against him, and he has therefore escaped punishment. He is now a house-breaker, and operates so skilfully that the police seldom have an op-

Poisoning is his specialty, and he is believed to have c
of a number of persons in that way. Whenever he take
has, of course, a purpose in it, and he has come into
sion of a good deal of money by the deaths he has
about. A greater villain than he probably never br
he seems to have no more objection to committing
than he has to smoking a cigar; and he is known as P
Killer — a nickname of which he is really proud."

"There is a young person I have not noticed before,
to my companion, pointing to the left. "Who is he? I
be a thief. He must have gotten into this company
take. Is he a gentleman seeking for acquaintan
underground life, like myself?"

The man I had designated could not have been mo
twenty. He had a fresh, handsome face, and when he
as he often did, his smile lighted up his countenance
shine lights up a landscape. It was hard to associ
with crime or vice of any kind, and hence my questio

The detective laughed, and said, "You mean the
He is one of the greatest scamps in all Paris, and on
most desperate scoundrels. There is nothing in th
he would not do for money. If I were not here, and a
were to offer him five francs, he would walk up to you
you politely, and blow your brains out, regarding
capital joke. The Badger is well educated, and is rep
be the son of a prominent lawyer by an actress.
away from home, and turned thief on instinct. He is a
ly without fear and without conscience. That crime
ural to him is proved by his enjoyment of it. He l
marvellous good luck, for, though frequently arrested,
never been punished, and the fact of his getting off ag
again is ascribed by some to the influence and wealth
father."

The detective would have told more; but by this ti
thieves, all of whom had drank liberally, began sing
coarse and profane song, in which morality, religion
decency were burlesqued, and which, rendered by the

r, revealing the stars, I seemed to have been transferred
nother sphere, and I wondered that such dens of crime
l exist and flourish under the beautiful exterior of Paris.

XXVIII.

THE EAST RIVER BRIDGE.

LAYING THE FOUNDATIONS UNDER WATER. — HOW THE WORK WAS PERFORMED. — THE CAISSON. — HOW IT IS MADE. — ITS MODE OF OPERATION. — WORKING UNDER WATER. — EXPLORING THE BED OF THE RIVER. — DESCENDING INTO THE BOX. — EFFECTS OF A GREAT PRESSURE OF AIR. — AN UNPLEASANT SENSATION. — A STRANGE SIGHT. — ACCIDENTS. — HOW A MAN'S ARM WAS CAUGHT.

A BRIDGE to connect New York and Brooklyn has long been desired, and many plans for such a structure have been made. It was finally determined to erect a suspension bridge high enough to permit the passage of ships beneath it, and stretching, in a single span, from one side to the other of the East River. Work was begun in 1870, and continued, with occasional interruptions. The bridge, by comparison with similar structures, is the longest and largest of its kind in the world.

The bridge rests on two piers, one on the east and the other on the west bank of the river. The eastern pier was begun some time before the other, and the work of laying its foundations was of a peculiar character. Ordinarily, where a pier is to be set in the water, a coffer dam is built around the place where it is to stand, and the water is pumped out. But in the present instance, this mode of working was deemed impracticable, and it was decided to lay the foundations by means of a caisson. This is quite a curiosity in its way, and well deserves a visit and a description. I did not visit the one on the east side, but deferred my caisson explorations till the work on the west side was under way.

On the invitation of Colonel Paine and Engineer Cottingwood, I was one of a party of four to descend into the

caisson to examine its workings and inspect its machinery. Arriving at the foot of Roosevelt Street, we found indications of the construction of a large building. There were numerous derricks, scaffoldings, and building materials in the vicinity, and everywhere there was activity. Just as we arrived at the works we found a gang of sixty men indulging in hot coffee, which is always served to them previous to their descending the shaft of the caisson. Their coffee drunk and repast over, and the roll-call answered, they walked in single file to the mouth of the shaft, and there waited the arrival of those whom they were about relieving.

Most of the men wore nothing but their shirts and trousers, with water-proof boots reaching above the knees. At a signal given by the foreman of the gang, some of them entered an elevator, while others proceeded down a spiral staircase, and were soon lost to view. Before taking the reader to the interior of the caisson, it may be well to state that it is nothing else than a large box of iron and wood, the full size of the intended abutment. This box is turned bottom upward, and rests upon its edges.

It is one hundred and two feet wide, and one hundred and seventy-two feet long, and nearly ten feet in height. Its immense weight is supported by several solid trusses of oak and iron, which run across the caisson; and in addition to this, it receives an upward support of forced air equal to forty thousand tons. The pressure of the air in the caisson is forty-four pounds to the square inch, being twenty-nine pounds more than the ordinary atmospheric pressure.

The air is sent down the caisson by means of pumps, there being fourteen engines, each of twenty-four horse power, constantly at work. In the centre of the caisson, an entrance is obtained by means of a shaft having a spiral staircase of over one hundred circular steps, and there is another entrance by an elevator, which, by the by, is the most agreeable way of descending, particularly if the visitor is inclined to corpulence.

It was down this entrance I went with the rest of our party.

Like the workmen, each of us swallowed a small quantity of hot coffee and biscuit, as we were told that we should suffer less from the effects of the descent. Under the direction of our guide, we took our stand inside the elevator, for the simple reason that we could not sit. There were no velvet-covered seats, as are generally found in hotel elevators.

At a given signal, we began our journey into the East River, and descended until we reached what our conductor termed the "lock." Here we changed our stands again, and entered the lock by crawling through an opening at the bottom of the elevator sufficiently large for a man of ordinary size to pass easily. This lock is an oblong iron box, or boiler, of just sufficient size to allow half a dozen persons to stand erect. It is eight feet long, and six feet in diameter. At the bottom of the lock there is an iron door or opening, similar to that through which we entered, which gives admission to the interior of the caisson. These iron doors are fitted with rubber, so as to make them perfectly air-tight.

When we had all entered, the door was closed upon us. We looked at each other, wondering what would be done next, and we soon found out. Our conductor, previous to starting the lock, gave us what he termed a few useful hints, so that we might be able to make the trip as agreeable as possible under all the circumstances.

"Now, gentlemen," said he, "in descending, you will find a disagreeable sensation, particularly about your ears. You will find great ease by closing the nostrils every few seconds, — as the pressure of the air will act upon the tympanum of the ear, — and also by inflating your cheeks to their full extent."

These instructions were given that we might cause an artificial pressure upon the inside of the ear, and thus prevent its rupture.

Our conductor then proceeded to turn a cock, to admit the air forced from above. In a moment it rushed in with a tremendous force, making a noise similar to that of a locomo-

discern our faces, and that was all. It took five or six
s to get the necessary amount of pressure into the
ad then the air was turned off.
seemed suddenly to lose our footing, and then to regain
d no sooner had we righted ourselves than we had
e sudden shoot, and this continued until we reached
ttom. The actual descent was made in about a minute
half, or perhaps two minutes; but owing to the pain
fered, it appeared to be three times as long.
e sensation we experienced was certainly very disa-
le and painful, and for a pleasure trip I certainly would
commend any one to undertake the journey. Should a
e down, however strong-minded she might be, I would
swer for the consequences. One of the party was so
fected by the pressure of the air that our conductor
turn off the cock frequently. The stranger's ears
him greatly, and blood began to spurt from them.
ing reached the bottom of the caisson, where the work-
ere digging out the earth and blasting rock, we were
d in the lock some minutes, to allow the admission of
the same density as that below. This being done, I
aded a short iron ladder leading into the bottom of the
n, and speedily found myself standing on the bed of the
, seventy-eight feet below water-mark.
re were several men working in their shirt sleeves, with

phere. The caisson seemed to be full of steam, as if a hundred washerwomen were plying their avocation at the tub. The bottom of the caisson is divided into several chambers by means of iron and wood partitions, with entrances leading into each other. The air does not seem impure nor unpleasant. According to an examination made a few days before my visit, it was then found to contain a small percentage of carbonic acid, but not enough to do any harm.

As soon as the sand is dug, it is sent up various pipes, four inches in diameter, which operate in the same way as siphons. It is odd to notice with what force the sand ascends to the top of the caisson, and it is all that six men can do to shovel it in fast enough. Boulders of trap rock were found embedded in the quicksand. These were broken up and hoisted out by an apparatus similar to a dredging machine, working in an immense shaft filled with water.

The shape of the interior of the caisson resembles very much the lips of an enormous bell, and in reality it is worked upon the same principle as an ordinary diving-bell, the water being kept out by the great pressure of air. As soon as the caisson is perfectly settled, and all the sand and debris down to the bed rock is removed, the interior is filled with concrete and masonry, and thus the pier obtains a foundation perfectly solid.

While making a tour through the various chambers, I found a pair of doves, which had been placed there for testing the effect of the compressed air. The birds appeared to have become accustomed to their new habitation, where they had been for several weeks. They looked, however, rather disconsolate and sickly, and I learned, a day or two later, that one had died from the effects of its imprisonment.

A black and tan terrier had also been taken into the caisson, but after it had been down a few hours it became paralyzed in its hind legs, and was taken up; and for more than a fortnight it did not recover from the shock to its system.

The scene in the caisson is a very novel one. The water, seen through the gas jets, sparkles in the pools at the bottom of the river, the men are toiling and perspiring amid the rushing and rumbling noise of the sand siphons, and everything appears in confusion. While our party was making its tour, it was found that our voices had completely changed; each one appeared to stutter, and altogether the voice had a very unnatural sound, as if we spoke in a half screeching key.

An attempt was made to whistle, but whistle we could not. The lips might be puckered, and you might blow as hard as you pleased, but it was all in vain, as not a note could be heard. Some of us tried to whistle by our fingers, but were unsuccessful.

Communication is had with the upper-world by means of a movable iron rod and a couple of dials, one above and the other below. These form the telegraph. On each dial are printed, in plain letters, the words, "All right," "Start," "Faster," "Slower," "Stop," "Less," "More," "Bucket is caught," "Highest corner," "Stopped," "Come up all;" and the last is the most pleasing call of the entire number to the laborers below.

Adjoining the dial is a thermometer, which indicated the atmosphere to be eighty-two degrees Fahrenheit.

Accidents occur in the caisson, in spite of all precautions. A short time before my visit, a small stone caught in the pipe of the siphon, and one of the workmen came very near losing his arm while attempting to pull it out. His hand was drawn into the pipe, as if by a powerful magnet. The man was thrown upon his face by the great power of the atmosphere, and at the same time his arm was drawn up the pipe: had it not been for four of his comrades instantly pulling his arm down, the limb would have been torn from his shoulder. He received severe injuries, and is not likely to be so careless again. The skin of the arm looked as if a quantity of boiling oil had been poured over it, and it soon became blistered from his shoulder downward.

After a stay of nearly an hour, the party proceeded to return once more to terra firma. We entered the lock, as on making the descent, through the small iron door; then the compressed air was allowed to escape until the pressure of the air was equal to that of the atmosphere outside.

While this was going on, a peculiar sensation was experienced, but it was not as disagreeable as that of making the descent. It seemed as though there was a rush of water through the ears, and we were diving. Ascending to the top of the caisson occupied about ten minutes, as the physician in attendance recommends that the change from the high pressure should not be made rapidly. We were all glad to breathe the pure air and enjoy daylight again. Several of the workmen stated that nearly every day some of them suffered from the work below, and said one, —

"We have all had the jams."

"What are the jams?" said I.

"Well," said another, "they ain't the jim-jams, brought on by drink, for we dare not take much, but a feeling like the flesh a tearin' off of our bones."

"We have the cramps in our legs, body, arms, and chest," said another, "and at times it causes us so great pain that we cannot work; we do not notice anything amiss until we have been out of the caisson for some hours, sometimes not until the next day. These 'jams,' as we call them, go away as quickly as they come, but sometimes return after another visit to the caisson."

The men are cautioned to abstain from drinking spirits, but with some the caution is not heeded, and those that will drink spirits in preference to coffee are generally the greatest sufferers.

The construction of the abutments of this bridge is a novel one. It was first introduced on the building of the St. Louis suspension bridge, and since then great improvements have taken place. When completed, the bridge will be a noble monument of engineering skill.

XXIX.

THE INUNDATION AT LALLE.

TION OF A MINE ON THE LOIRE. — HOW THE MEN WERE SAVED. — SONG HE PUPILS OF THE MINING SCHOOL AT ST. ETIENNE. — TERRIBLE FLOOD . MINE AT LALLE. — BREAKING IN OF A RIVER. — COURAGE OF AUBERTO, ORKMAN. — SAVING SIX LIVES. — PLAN FOR RESCUE. — DISCOVERING THE REABOUTS OF THE PRISONERS. — ONE MONTH'S WORK IN THREE DAYS. — SING THE DRIFT-WAYS. — SIXTY FEET OF TUNNELLING. — IN THE DARK- WITH A CORPSE. — STORY OF THE RESCUED. — THIRTEEN DAYS OF L. — FINDING THE BODIES OF THE DEAD. — ONE HUNDRED AND FIVE DROWNED. — SAVING A CHILD. — EATING WOOD AND LEATHER TO SAVE . — A HORRIBLE SIGHT.

one of the mines on the River Loire, about thirty years here was a terrible accident, caused by the sudden ion of the water. The water came in like a torrent, and the miners up an inclined gallery, where there was no . The people above ground rushed to their assistance; gineers brought their plans of the mine, and determined e the enclosed men were to be found, if still alive. men volunteered to go to the assistance of their com- , and a new gallery was begun in the direction of the sed place of refuge. The blows of the pick upon the vere at first unanswered; but after a while, faint sounds heard in response. The rock was hard, and progress slow; but every man did his best, working night and Sound is transmitted through rock with great facility, n a little while the workmen could hear the voices, as as the knocking of their imprisoned friends. Six days d in this way, and at length a hole was bored through ck, and the colliers were found to be all living.

ough they were near starvation, and had eaten their es, and even their leather straps, their first appeal was

for light, not for food. Prolonged darkness is distressing in the extreme, and these men had suffered the total absence of light nearly the whole of their time of imprisonment. Candles were passed through the bore-hole, and then a tin tube, through which broth was poured. The work of relief was pressed forward, and at the end of the sixth day the sufferers were released and brought to daylight, amid the cheers of the men assembled around the mouth of the mine.

The story of the release of these miners is familiar to all the inhabitants of that region. The pupils of the Mining School of St. Etienne composed a ballad, of which the following is the opening stanza: —

"Mineurs, ecoutez l'histoire
De trois malheureux ouvriers,
Restés sans manger ni boire
Pendant six grand jours entiers.
Au fond d'une galerie
Serrés comme en un local,
Ils auraient perdu la vie
Sans la coupe verticale."

This ballad was sung two or three times daily, at the beginning and end of lessons when the master was not present. One of the teachers of the school assisted at the rescue of the miners, and used to tell the story to his pupils. He added a moral to it, after the manner of Æsop with his fables, and endeavored to impress upon the school the importance of vertical shafts from all the principal galleries to the surface. Many lives have been lost in mines in consequence of the absence of these shafts, and in every locality where mining is conducted on an extensive scale, the law should compel the owners to make at least two openings to the outer world.

In 1862 an inundation occurred at the mine of Lalle, in France, by which one hundred and five persons lost their lives. The story is thus related by M. Simonin: —

On the 11th of October, between three and four o'clock in the afternoon, a violent storm visited the country, and it is asserted by some of the inhabitants, that a waterspout had

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burst there. The waters of the River Cèzo, as well as those of a stream and of a ravine, which is dry at ordinary times, both of them being tributary to the Cezo, rose higher than they had ever been seen before. It was a vast inundation, or, as the people of that region describe it, a deluge. The mine extended under the river, and its mouth was not far from the bank. The water made a whirl at one point, and then rushed into the mine through a large opening over the outcrop of one of the coal seams. There was a rumbling noise all through the mine; all hands were at work under ground, and there was danger of a terrible calamity. Some of the men managed to escape by the ladders, while others hastily ascended a shaft, and floated upwards on the surface of the water.

A noble act of courage and devotion was performed by a Piedmontese workman by the name of Auberto.

He escaped up a shaft, and as he did so, he gave the alarm to a comrade who was at work in a lower level. Auberto then ran to another opening, fastened the tub to a rope, descended, and called, the water falling all the while in a perfect torrent. Five men came out; four entered the tub, and were saved; the fifth hesitated a moment, and was lost. As soon as they reached the surface, Auberto caused himself to be lowered again. Perceiving a man entangled in the timbering of the lower gallery, he drew him out, threw him into the tub, and was drawn up at the moment the water took possession of that part of the mine.

Auberto had saved six lives, and would have saved more, but no other point was accessible, the whole mine being then under water.

There was only one outlet remaining, and this had been formed by the breaking of the ground near the point where the waters were rushing in. Lights were seen shining there, and ropes were thrown in; but the violence of the waters increased, the ground fell in afresh, this last outlet became closed, and all the men in that part of the mine were drowned. In half an hour the interior of the mine was converted into a

lake. The air and gas in the mine were compressed by the weight of the water, and were forced out through fissures in the ground, producing the effect of gunpowder, throwing the earth to a considerable distance, and in some cases overturning houses.

Everybody in the vicinity rushed to the mouth of the mine, and an anxious and terrified crowd was speedily collected. The engineers and superintendents were first on the spot, and were speedily joined by the engineers and workmen from the neighboring mines.

No immediate relief is possible. Perhaps the colliery is only a vast tomb, for out of a hundred and thirty-nine men who entered the mine in the morning, only twenty-nine have escaped. A hundred and ten are scattered in the interior of the mine, some at one point and some at another, at different depths and in varying conditions. How are they to be found? and is it certain that even one of them is living?

A dike was made at the surface to keep out the water, and the engineers consulted the plan of the mine, in order to devise the surest and readiest means of relief. While this was being done, a young boy, who had previously been employed in the mine, entered one of the galleries, and, after knocking for some time on the walls, thought he could distinguish sounds answering to his own. He called his comrades, and repeated the experiment with the same result. The engineers were informed, and everybody hastened to the spot. M. Parsan, of the Imperial School of Mines, had arrived from Alais, to direct the work of salvage. He ordered everybody to maintain the most perfect silence, and then he made a signal by knocking with a pick at regular intervals of time. He has written an exciting account of these operations.

"With ears resting on the coal," he says, "and holding our breath, we soon heard, with profound emotion, extremely faint, but distinct and timed blows, — in fact, the miners' signal, — which could not be the repetition of our own, because we had only knocked at equal intervals."

Between the prisoners and their rescuers there was a solid

wall more than sixty feet thick, which must be cut through; but the greater part of the miners were shut up in the mine. But volunteers were ready from the other mines, and soon the blows of the pick carried hope to the hearts of the prisoners. The work began at six o'clock on the evening of the 12th, at five differents points in the gallery where the sounds were heard.

The five drift-ways were made towards the place where the sufferers were enclosed. One pickman at a time worked in each heading, and he was relieved at the moment when he began to feel wearied. He worked with all his energy, and the coal which he removed was carried away in baskets as fast as it was detached. The labor proved more difficult in consequence of a want of air, and it became necessary to put up ventilators. Sometimes the lamps would only burn in front of the air-pipe. At two o'clock on the morning of the 14th, the voices of the imprisoned colliers could be heard. "There are three of us," they said; and they gave their names. The coal increased in hardness, and the heat became unbearable. All that day and the next the best pickmen went to the front, hewing the coal with all their strength, the prisoners all the while making themselves heard. Finally, at midnight of the 15th, one of the drift-ways was completed, and the three men were reached.

Only two were alive. The youngest was sobbing, the other was in a high state of fever, and the third, an old man, had been unable to survive the trying ordeal, and was found dead not far from his companions.

The two survivors were covered with blankets, refreshed with cordials, and carried to the hospital of the mine, where they were put in the care of the physician, who next day pronounced them out of danger.

The work of rescue had continued without intermission for seventy hours. On calculating the amount of rock and coal removed from the drift-ways, it was found that a full month would have been required, under ordinary circumstances, to do the work which had been performed in three days.

The most precise details of the circumstances of their confinement were given by the two rescued colliers. They were at work in a heading when the water was heard coming upon them. They then ran to the upper end of the gallery, where they were found—a narrow place with a considerable slope, and very slippery. With their hands and the hooks of their lamps they dug a little place in the shale to sit down in; the water was up to their feet, and they were in a sort of bell, in which the air was highly compressed. They felt a singing noise in their ears, and for a time they lost their voices. Their lamps went out for want of oil. They tapped with the heels of their shoes on the walls of the gallery to summon assistance. This sound was the one which was heard, but only after they had been imprisoned twenty-four hours!

Convinced that help would arrive, the eldest of the three, the one who was destined never to behold the light of day again, shed tears of joy. Another, mad with thirst, descended into the level with the water up to his armpits, in a vain search for a way through the rubbish; but he afterwards regained his place, being guided by the voices of his companions. The youngest, seventeen years of age, frequently fell asleep, and would have fallen into the water but for the help of his neighbor, who held him in his arms like a child, and thus saved him from death. At one time the noise of the ventilator connected with the operations of their preservers reached their ears, when they imagined that a new influx of water was about to occur, and they became discouraged. The old man was constantly active. Overcome by his efforts, he slid from his resting-place into the water, and was drowned without a struggle, and without uttering a cry. Frozen with horror, and held motionless in their places, the two others dared not move to his assistance, and they even refrained from announcing the accident to those who were working to relieve them. "There are three of us," they cried, when in reality only two were alive.

The one who suffered from thirst finally determined to move, but touching the dead body while drinking, he clambered

back again. Fatigue, bad air, and this fearful vicinity to a corpse, rendered him delirious, and he said to his comrade, "Come, let us leave this." The other was frightened, and in order to divert his attention, suggested that he should go and drink again. He went, and returned, striking against the dead body in passing. "The darkness," said he, made the place more horrible than anything I had ever imagined."

In the mean time the water got lower in the level, but it was cold there, and the two captives remained in their places where the air was dry and warm, though constantly growing more impure. At last they were recovered, and carried into the light by their comrades. By a strange phenomenon they had lost all notion of time, and thought they had not been in the mine more than twenty-four hours. Other instances of a similar nature are recorded. Some miners of Hainault, who lived twenty-five days shut up in a mine during an inundation, thought they had only been there eight or ten hours.

While the operations for saving the lives of these two men were in progress, other works were undertaken, with the view of penetrating the interior at other points. Pits were dug where the miners were suspended from ropes for fear of explosions, while other workings, which had been injured by the flood, were repaired. One of the old shafts was undergoing repairs at the time of the accident. In ordinary times, fifteen days, at the least, were required to refit the engine, put up the ropes, and get everything ready. In this instance everything was done in four days: the pumping began on the 15th of October, and was not again interrupted.

The workmen continued to bore and dig shafts. On the 24th of October, thirteen days after the accident, the men working at the bottom of the shaft heard shouts. Three men were still alive, only separated by rubbish and a vacant space of ground from the point where the workings were in progress. Disputes arose as to who should save them, each man desiring the honor of going down first. At last the favor was

given to one of the overmen, who descended and found two men, who clung to him, and begged for relief. He encouraged them, and fed them from a can of broth which he carried. In a little while the timbermen made the place secure, and the captives were brought out.

A third prisoner, a child, was still left. His comrades described the place where they had buried him in the coal to keep him warmer. The engineer hastened to the spot, and seized the child, who embraced him and wept; the three were taken at once to the hospital, where they soon found themselves in the company of the other two, who had already been saved.

Like their comrades whose story I have just told, the three last colliers had fled before the water from the first moment of its breaking in, and finding a rubbish passage stopped up, they despairingly made an opening into it. They afterwards clambered to the heading of the gallery as a last refuge. Their lamps were out, but they heard the water rise, and retreated before it. The noise occasioned by falls, and the breaking of timber, as well as the sound of explosions caused by compressed air, reached their ears distinctly, like a frightful tumult, which seemed to announce to them the last hours they had to live. One of them had a repeating watch, which he caused to strike several times; but it stopped on the morning of the 12th of October at a quarter to three o'clock. They heard the noise of the tubs plunging into the water in two adjacent shafts. They conceived the idea of reckoning the progress of time by means of the short intervals of rest caused by changing the gangs. They thus formed a very near guess at the period of their captivity, which they reckoned at fifteen days, instead of thirteen.

To satisfy their hunger, they ate the rotten wood of the timber supports, which they crumbled in water, and then devoured, having previously eaten their leather belts. They could quench their thirst at will, and that sustained them. Afterwards the water rose to where they were, and wet their feet. Subsequently it fell, and then they thought of fastening

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heir boots to a string and drinking out of it. Finding
r retiring, the child resolved to go in search of an
Swimming or holding on by the walls, he groped his
ng, but found nothing. Exhausted and chilled with
returned to his companions, who lay close to him to
him, and then covered him with small coal, in which
he was found.

o men were liberated after being shut up thirteen days:
mperature, the pressure, and the composition of the air
ch they were found, were favorable to life, and, more-
hey had the means of quenching thirst. Under such
ons, it may be possible to live a month. Our nature
dure a great deal when it is compelled to exert itself.
ergy and tenacity of life are great, and few men know
uch they can undergo until they are driven to make the
ment.

y five were saved in this catastrophe at the mines of
All the rest of the one hundred and ten perished.
age of the mine was steadily pushed amid innumerable
ents, and the colliery was free of water on the 4th of the
ring January, fifty million gallons of water having been
ved. During the interval the bodies were slowly dis-
ed, and heart-rending was the spectacle which the mouth
e shaft presented as the bodies of the victims were
n up, relatives and friends pressing forward and endeav-
o recognize or guess at some well-known face. And the
in the mine, as the water slowly fell and the bodies were
floating on the surface with the light thrown upon them
e lamps of the searchers, is described as horrible in the
me

om the managers to the humblest workman, everybody
cted with the rescue did his full duty. Every man
with his neighbor in doing what was needed, however
ult it might be. All the directors of mines in the De-
ment of the Gard, assembled, and brought their overmen,
tyors, and workmen, who, in every instance, gave proof

of a courage and self-denial which never failed for a single moment. The government bestowed crosses and medals upon those who rendered material assistance in the rescue, and the sad occurrence will long be remembered in and around the mines of Lalle.

XXX

PERILS OF THE MINER.

ESCAPE OF THE AUTHOR. — CAUGHT IN A LEVEL. — SETTLING OF THE — BREAKING TIMBERS. — A PERILOUS PASSAGE. — FALLING OF A THREATENING DANGERS. — ADVENTURES OF GIRAUD, THE WELL- — CAUGHT IN A FALL OF EARTH. — THREE WEEKS WITH A CORPSE. MONTH WITHOUT FOOD. — HOW HE WAS RESCUED. — A MINER WITH COAL. — HIS RESCUE. — AN IRISHMAN'S JOKE. — INUNDA- CURIOUS THEORIES OF THE MINERS. — EFFECT OF STRIKING A OF WATER. — DRAWING THE MEN IN A MINE. — THE GRAHAM- — CLOSING THE SHAFT. — A TERRIBLE STORY. — EXPERIENCE OF A ENGINEER. — CASUALTIES AND THEIR NUMBERS. — SUFFOCATION OF HUNDRED AND SIXTY-ONE MEN IN ONE MINE.

once in a mine in Colorado, when I fervently wished ut of it. I had been there a day or two before, and at in one of the levels I was just able to stand erect. visit in question I found I could not stand erect with- ng my head. I was certain that I had not grown six aller in the mean time, and I accordingly concluded roof had settled. All at once, while proceeding on k, I was astonished at hearing a crackling sound ne; and on looking around, I discovered that some of ers were giving way.

was a predicament. The breaking timbers were . me and the entrance to the mine, and I knew that if uld fall, so as to close up the passage, I should be om escape.

not take a long time for me to determine what to do. isk of being crushed by the falling timbers and rock, backward, extinguishing my light in the rapidity of ements, and becoming wrapped in almost complete

darkness. Luckily, however, there was a light burning in the level; and as I crept among the breaking timbers, it was as welcome to me as the polar star to a man at sea, when his compass has become unreliable.

Another and another of the timbers gave way as I walked, or rather crept, beneath them. When they were broken in the centre, they had partly, but not completely, closed the passage, their ends being held firmly in the rock. I managed to reach the other side, and as soon as I considered myself safe, I turned round to see what was going on. The timbers settled very slowly; there was no one on the level beyond them; and had any persons been there, the settling of the roof was so slow, that they would have had plenty of time for escaping.

When I reached the outside, I made a vow to avoid similar dangers in future, and it was some time before I again ventured where I should be liable to a similar accident.

Falls of the roof are a kind of danger which is always thought of when underground works are considered. In certain kinds of rock there is no liability to occurrences of this sort. The roof is as solid, and as well supported, as that of any house, and there is no danger of its yielding; but where the rock is slippery and loose, or where the ground is soft, the peril that threatens is constant.

Falls of earth are not unfrequent in digging wells. Many a man has lost his life in consequence.

An exciting story is told of a well-digger, named Giraud, who was excavating a well near Lyons, about twenty years ago.

The earth caved in, and Giraud found himself dashed to the bottom of the hole by the side of a fellow-workman. Luckily, the timbers fell in such a way as to form a sort of arch above their heads, and thus saved them from being crushed at once. Some men, who were above at the time of the accident, immediately set to work to save the sufferers. It was necessary to dig a new shaft near the first, and then connect the two by a drift-way, which would reach the men at the point

they were enclosed. Their efforts were constant, but
e of them, a whole month was spent in reaching the
as fresh falls of earth were constantly occurring in the
workings. Giraud and his comrade could hear the noise
pick, and could converse with the workmen, and
them that they were alive.

the end of a week, Giraud's companion died of exhaus-
nd starvation. Giraud was a man of great strength,
mind and body, and bore up as well as he could under
ffering. The dead body of his companion, which lay
im, poisoned the little air he had to breathe; but some-
he lived day after day for a whole month. Every
at his rescuers expected to reach him, when some fresh
nt occurred, and much of the work had to be done over
On the thirtieth day they reached the prison, and
d was saved.

was wasted to a skeleton, and unable to stand. His
was a mass of sores; gangrene had attacked all his
s, caused by the corpse which had been rotting at his
for three weeks. He was carried to the hospital, and
attention was given him; but he had suffered too much,
died within a month of the day of his rescue.

ccasionally masses of rock drop from the roof without the
warning, and fall upon the heads of the miners. Some-
a man may escape with the loss of a limb, or he may be
d outright. In other cases, the walls and timbers give
, and men are crushed beneath their weight.

story is told of a miner who was caught by the fall of
coal which nearly crushed him, but he had sufficient
gth remaining to call for help. A comrade heard him,
gave the alarm. All the men who could work in the
space were immediately gathered; and a part of the
having been removed from around the sufferer, his head
one of his hands became visible. He was lying on his
side upon the floor of the gallery, with his legs doubled
ath him. There was a mass of broken timber above him,
at he could not move, but fortunately his chest was not

compressed. Air was supplied him by means of a ventilator and a tube. The rails and some of the other timbers by which he was enclosed were cut through, and a space was opened in such a way as to reach him from below. He did not lose courage a moment; he remained perfectly cool, and gave his preservers several useful suggestions. Finally, after six hours of suffering, he was removed.

In several instances miners have been enclosed in such a way that escape was impossible. All efforts to relieve them were unavailing, and those who remained uninjured from the fall of the rock died of suffocation or starvation.

Let us change a moment from the horrible to the ludicrous. A few months ago, an Irishman, who was digging a well in Illinois, left his work, and went to breakfast. When he returned, he found that the earth had caved in. There was a clump of trees a few yards away, and after looking around to ascertain if any one was in sight, and knowing that some friend would be there shortly, he took off his coat, hung it upon a post, and then, taking his shovel and pick, retired to the shelter of the trees. He had just concealed himself, when his friends made their appearance. They saw the coat hanging upon the post, and they saw that the earth had caved in. Immediately concluding that their friend was buried below, they set at work to rescue him.

They worked with the greatest energy for two or three hours, and at the end of that time had removed all the fallen earth. But no Pat was there. Just as they were wondering what had become of him, he walked leisurely from his place of concealment, and thanked them for what they had done. At first they were inclined to be indignant, but finally concluded that it was a good joke, and a few drams of bad whiskey removed all differences.

The danger of underground inundations is as great as that of falls of earth. Water is constantly accumulating in a mine, and sometimes in such quantities as to defy all attempts to keep it under control.

Miners have curious theories about streams of water which

ter the mines. Some of the English miners believe the rth is alive, and they compare the veins of water in the rth to the veins and arteries of the human body. Some- mes they say, "When the water breaks into our working- ces, it is the Earth which revenges itself upon us for hav- cut one of his veins." The Belgian miners have the same lief, and they call the water which flows out of the coals, *ang de la veine*,' that is, 'the blood of the vein.'"

Inundations of mines are frequently fatal. Sometimes the ter enters with great force. One day, in an English coal ne, the water fairly drove out the auger with which the rkmen were boring a hole. It came as if from the nozzle a fire engine. The workmen made several attempts to g the hole, but could not, and were driven out. A few urs later the mine was flooded. Pumping machinery was t up, but it was not until the end of seven years that the ter could be removed. It was only then stopped by means banking, that prevented its further entrance.

In a mine near Newcastle, many years ago, there was an undation which enclosed ninety men in a place where it was impossible to relieve them. Several persons, who were work- ing close to the shaft when the water entered, managed to escape, but they were very few in number. The accident occurred in May, and it was not until the following February that the bodies of the drowned men were recovered. With one exception all were recognized.

At another coal mine, which was worked on the sea-shore, and extended a distance of fifteen hundred yards under the Irish Sea, the manager, in his anxiety to produce a large quantity of coal, recklessly cut away some of the pillars which supported the roof. One day the whole neighborhood was alarmed with the report that the mine had fallen in. The commotion was so great that many persons on the shore ob- served the whirl of the sea directly over the spot where the water entered. A few of the laborers escaped, but thirty-six men and boys were drowned. The accident happened more than thirty years ago. The coal mine is now, and always

must remain, under water, and the bodies have never been recovered.

Some of the most terrible mining accidents are those which occur in consequence of the closing of the shafts. Where a mine has two shafts there is little liability of such accidents; but where there is only a single shaft the danger is constantly threatening. The terrible calamity at Avondale, which is fresh in the minds of many readers, will be described elsewhere.

A similar accident at an English coal mine, a few years ago, was even more terrible in its results than the calamity at Avondale.

The beam of the pumping engine gave way, and killed five men who were at that moment coming up in the cage. One hundred and ninety-nine men and boys were then working under ground. The enormous beam of the engine weighed more than forty tons. In its fall it carried down all the timbers of the shaft, damaging the walls in several places. The rubbish and broken timbers accumulated in the shaft, and closed the only mode of egress for the miners. The beam and timberings cut off all connection between the interior of the mine and the outside world. The mine was furnished with ventilating furnaces, in which a large quantity of fuel was burning, and it was supposed that the imprisoned miners died of suffocation within twenty-four hours. Some of the men who were imprisoned tried to force an outlet, but they were unable to do so, and died in the effort.

Many accidents of this kind might be described. In the various coal-mining countries of the globe, they may be said, in the aggregate, to be of almost weekly occurrence. Where the owners of mines neglect or decline to provide their works with two entrances, it is imperatively necessary, for the protection of life, that the law should interfere, and compel them to do so.

A few years ago, at a mine in France, the engineer one day observed that the cages did not work properly in the guides. Fifty-six yards below the surface he discovered that the lin-

of the shaft deviated from the perpendicular. The joints
displacements were visible at several points. All the
, three hundred in number, were ordered to leave the
».
en went down the shaft to cover the openings, but the
lt was only to create fresh ones. For the next two days
lining of the shaft repeatedly cracked.
he planks broke one by one, and the water rushed into the
xs. The consulting engineer of the mine was called in,
when he arrived he descended with the superintendent,
of them in fear that they were going to certain death.
ir lamps went out while they were descending, but they
ied a lantern, which was hanging to the bottom of the tub
hich they descended. By the light of this lantern they
overed an enormous opening in the middle of the lining.
ıe, and earth, and rubbish were continually falling, and a
ent of water ran through.
Let us go up again," said the engineer. "The water is
ter of the situation, and all hope of saving this working is
e."
ı relating this incident afterwards, the engineer said, "I
d ten years in half an hour. My hair turned white in that
lous descent, which I shall never forget as long as I live."
few hours afterwards, holes which began at the middle of
shaft extended from top to bottom. At the pit's mouth,
immense opening had formed nearly forty yards in diame-
and ten yards deep. Engine, boilers, buildings, ma-
ıery, and scaffolding gradually fell into the opening. At
h movement of the ground a fresh ingulfment took place.
sky was dark and covered with clouds. The timbering
he shaft gave out sparks under the enormous friction
ch was caused by the sudden fracture of the wood. A
cock, shut up in the neighboring court-yard, gave signs
ılarm, and uttered loud cries at every movement of the
und, and at every fresh fall. "No poet could describe,
painter represent, the desolating spectacle which we wit-
sed," said the engineer, in concluding the account of the
urrence.

In this country it is next to impossible to give correct statistics of the number of lives lost by these accidents. In Great Britain and France statistics are obtainable.

In those countries, according to the report of the inspectors of mines, about one half the mining accidents are occasioned by falls of the roof and coal. A third of the accidents are in the shaft in various ways. The remainder, or one sixth of the casualties, occur from blasting, explosion of fire-damp, suffocation, and, finally, inundation.

According to an English report, there was one death for every two hundred and sixteen persons employed in the mines. It was estimated that one life was lost for every sixty-eight thousand tons of coal obtained. In some districts of England the proportion was one life lost for every twenty-two thousand tons. In the year 1866, six hundred and fifty-one lives were lost from explosions of fire-damp. In the previous year there were only one hundred and sixty-eight deaths from the same cause. Altogether, in the year 1866, there were fourteen hundred and eighty-four deaths from mining accidents in Great Britain alone. The total number of deaths from all violent causes in the mines of Great Britain, in ten years, was nine thousand nine hundred and sixteen. Twenty per cent. of these were caused by fire-damp explosions.

The greatest number of lives lost at any one time through mining accidents was at the Oaks Colliery, in 1866, when three hundred and sixty-one miners lost their lives.

At the Hartley, Wigan, and Bury Collieries, many fearful accidents have taken place within the past few years, whereby many lives were lost. These accidents, in justice to the owners, or superintendents, let it be said, are not always due to the want of precaution on the part of the managers, but from gross neglect, or through non-observance of the rules under which the mine is worked. For example, the men were very careless in the use of the safety-lamps. Every lamp is locked before it is given out, and every care is taken to prevent its being opened. The men will occasionally amuse themselves by trying to pick the locks, and that, too, in places where the

..., the daily papers were filled with long details of
..., the recovery of the bodies of the victims, the dis-
...scenes at the mouth of the mine, and at the graveyard,
...brave deeds of the men who were fortunately absent
...mine at the time of the explosion.

...ptions were opened in nearly every church for the
... the survivors, and at the suggestion of Queen Vic-
...then Lord Mayor of London and Common Council
...ublic meeting to raise money for the families of the
... The appeals were liberally responded to through the
...ntry. Many of the wives of the dead miners re-
...e pensions, and all the bereaved families were placed
...mediate want.

XXXI.

THE MAMMOTH CAVE.

ROMANCE AND MYSTERY OF CAVES. — THE FAMOUS CAVES OF THE WORLD. — THE GREATEST CAVERN ON THE GLOBE. — ITS IMMENSE FAME. — AMERICANS' NEGLECT OF IT. — CAUSE OF THEIR INDIFFERENCE. — SITUATION OF THE MAMMOTH CAVE. — ITS MISERABLE MANAGEMENT. — ANNOYANCES AND IMPOSITIONS PRACTISED UPON TOURISTS. — JOURNEY THROUGH THE VAST TUNNEL. — WHAT ONE SEES, FEELS, AND DOES. — CONSUMPTIVE GHOSTS. — WONDERS OF THE STAR-CHAMBER. — DESCENT INTO THE BOTTOMLESS PIT. — CROSSING THE STYX AND THE LETHE. — MARVELLOUS ECHOES. — STARTLING ACCIDENTS. — WOMEN IN AWKWARD SITUATIONS.

Caves in all ages have been associated, not only with mystery and romance, but with sorcery and superstition of every conceivable kind. Fable and tradition have converted them into the abodes of demons and witches, and history shows that robbers and law-breakers have always made them places of refuge and shelter. Every mountainous or picturesque region I have visited has abounded in witches' caves, robbers' caves, murderers' caves, and caves generally, in which supernatural rites and horrid deeds are supposed to have been celebrated or committed. The dark, dreary, and weird quality of many caves, added to their unique and fantastic formation and uncertain windings naturally awake a feeling of awe, and appeal strongly and strangely to the imagination.

The ancient priests, in order to influence favorably the minds of the ignorant, pretended that the divinities they claimed to interpret had their residence in deep and dreary caverns, and that thence they revealed their mighty purpose to their mortal agents. The oracles of Delphos, which princes and sages were wont to consult, were interpreted, as it was assumed, by a priestess sitting at the mouth of a cave, and

claiming to predict the future of nations, and tell the destiny of kings. The old Norsemen performed their barbarous rites in caverns: the Indian Brahmins devoted caverns to religious purposes, and from natural openings in the rocks constructed gorgeous temples. These subterranean chambers were doubtless the earliest abodes of men, and even now, in certain uncivilized regions, they are so employed. Petra — the Sela and Jokthеel of the Bible — continues to be visited as a curiosity, because its ruins plainly indicate that its inhabitants dwelt in spaces hewn out of the solid stone. That caverns were used for the dead as well for as the living is evinced by the Catacombs of Thebes, Rome, Naples, and Malta.

The greatest caves known — new ones are constantly being discovered — are of limestone, and of comparatively recent origin. Geology teaches that the primary formations of caves are many, though small, being produced by the action of water coursing through the strata, and that the continuation of this process for ages creates the vast and beautiful chambers, which all of us are so fond of exploring. Sweden and Norway boast of granite vaults, especially Marienstadt, of extraordinary dimensions, though some of them have been, as yet, but partially penetrated. The vicinity of Quito contains caves of modern porphyry, and the Isle of France caves of lava. Gurtshellir is a cavern of lava in Iceland, forty feet high, fifty broad, and one mile long. The caves of Agtelek in Hungary, and of Adelsberg in Carniola, — the latter noted for its transparent white pillars and brilliant stalactites, — are among the most remarkable in Europe.

Adelsberg has an unusual interest for naturalists, because a strange reptile, called the proteus, half a lizard and half an eel, has its habitat there. It has an extremely elastic constitution, and an extraordinary adaptability, as may be inferred from the fact that it subsists equally well on land or in water, imbedded in rock or buried in mud, requiring neither air nor light, food nor drink, for the sustainment of its existence. What an excellent *littérateur* the proteus would be as respects its limited necessities! If it happened to be an unappreciated genius,

like most literary men, it need not feel any concern, for it could afford to wait until the world had come round to it, and the age had grown worthy of its thought. Fame, being a bubble, and therefore air, could not injure the nondescript creature, nor could the throwing of mud, as is the custom of journalists, mar it in the least. Much as it might be in (hot) water, it would not be troubled, and as to detraction and misrepresentation, its house would be (occasionally at least) built upon a rock, and would therefore stand firm.

In Venezuela is the celebrated cave of Guacharo, among the loftiest precipices of the mountain range; the entrance being through a gloomy ravine, running above a subterranean stream, the banks of which are covered with luxurious vegetation. Guacharo, as the name implies, is the resort of immense quantities of night birds, and their harsh notes resounding through its dismal recesses gave it the reputation, with the ignorant natives, of being the abode of the devil and his imps. For generations they have had traditions of dreadful ceremonies and hideous orgies held there, and have believed that many wicked persons have been seized by the imps, carried into and tortured in those awful recesses. They would not enter the cavern for any earthly consideration, sincerely believing that to do so would insure the loss of their souls. Humboldt, so far as known, was the first man who ever set foot within Guacharo; and he then succeeded, after unwearied patience and perseverance, in inducing a certain number of natives to accompany him as guides. They had not proceeded far, however, when the clamor of the birds so terrified them that they fled, in spite of every effort of the great naturalist to calm their superstitious fears.

Near Iletski, in Russia, is a freezing cave, so called because, reversing the order of the seasons, it is partially filled with ice in the summer, and altogether free from ice in the winter. Not a few of the caverns of the old world have been found to contain the bones of extinct species of animals. One of these, at Kirkdale, in Yorkshire, was discovered about half a century ago, and in it were quantities of remains of bears, lions, tigers,

, and hippopotami, all of orders that had passed away. presumed that the Kirkdale cave was for a long while a den of hyenas, and that some great inundation destroyed and their kind.

he greatest cave known on the globe is the Mammoth Cave entucky, situated in Edmonson County, near the Green r, ninety-four miles from Louisville, and nine miles from City, the station on the Louisville and Nashville Railway passengers get off when they wish to visit the celed cavern. The Mammoth Cave is world-renowned. I found that the people of every nation, even our antipodes, acquainted with it, though that may be the only thing in ers of which they have any clear apprehension. I ion if there be any other natural curiosity half so well n as that. Never have I travelled in any domain inhabby intelligent people, who had not only heard of it, but did not have something like accurate information respect- its extent and peculiarities. Famous as it is, and easy of ss, comparatively few of our countrymen have explored Indeed, the very ease of its access has prevented a great y persons from going there who would otherwise have e. What we can do at any time we are not likely to do all; for any time is really no time. I have met residents Naples who had never ascended Vesuvius, or seen the s of Pompeii. I am acquainted with citizens of Schaffsen who have never set eyes on the magnificent Rhine ls. There are Parisians who have never been in the Louvre ery, or the Park of Versailles; Romans who have never ed before the Apollo, the Laocoön, or the Transfiguration; mans who have never been within the Parthenon; Cai- to whom the pyramids are a dream; denizens of St. rsburg unacquainted with Moscow; Viennese ignorant of Belvedere and Schönbrunn; Berlinese unfamiliar with dam, and cultivated Londoners who have never made a rimage to Stratford, to the tomb of the most wonderful s the world has yet shown.

t is not strange, therefore, that Kentuckians, liberal as

their state vanity is, should often die without "doing" the Mammoth Cave. I remember how often I went within a few miles of the cave before I took the trouble to visit it, and that, finally, dissatisfied with myself for its long neglect, I made a special journey from New York to carry out my much deferred purpose. For several years a branch railway has been talked of from Cave City to the Cave; but it has never been built, needful as it is in the saving of time. Eighteen miles of coaching, in these rapid and driving days, appear to the average traveller considerable of a task; and when to this is added the two full days required for an exploration of the enormous cavern, it is easy to understand why so many persons refuse to examine the subterranean chamber lying along the Green River.

You cannot do the cave in much less than four days, owing to the determination of the coach-driver and the keeper of the hotel to delay tourists as much as possible. I still recall my first experience, and the second and third have not been in any essential respect dissimilar. The train reached Cave City at twelve o'clock, but the vehicle that was to convey me to the vast cavern would not leave for more than two hours, this arrangement being entered into by interested parties to secure each passenger for dinner at the railway station inn.

The conveyance takes its departure very leisurely, and before you are fairly inside or outside, as the case may be, you are obliged to pay not only your fare to the cave, but your fare back, even if you have no intention of returning for a month. This ruffles most people, and impregnates them with the notion that the astuteness of negotiations in that neighborhood is not far removed from swindling — a notion apt to be strengthened as they go on. Arriving at the Mammoth Cave Hotel, a great, rambling, ill-kept, uncomfortable collection of frame buildings, of the kind of which travellers in the South cannot be ignorant, you are informed that you are too late to enter the cave on that day.

There are two routes — the long, and short; the former extending nine miles from the mouth of the cavern, and the

for merely mercenary reasons. Men frequently
y twice or thrice the rate of the day's board for the
of making the entire underground journey in a
. This is refused, because it would fully expose
nd give an opportunity for victims to advertise the

y grumble — that is the privilege of every free-
en — but you can't help yourself. The public house
he guides, and the guides will do nothing contrary
nnoying and cheating customs it has established.
l, the conductors, and the guides, are in league one
other, and as there is only one Mammoth Cave, and
ny of getting into it, if you are really determined
you may growl and swear as much as you please,
ust conform to the rules that have been laid down
ivate benefit of the little ring, and for your own ha-

ve was accidentally discovered some seventy years
hunter, and ten years later was worked for the pur-
ocuring saltpetre; the company so engaged finding
table, and at last abandoning it to curiosity-seekers
perty belonged originally to a Dr. Croghan, who di l
s since, leaving it to the heirs of the [General] Jes-

limits of their real estate, will be discovered; and for this reason all visitors are forbidden to carry compasses, or make topographical observations upon the bearings or directions of the great natural tunnel. They have purchased, since 1860, some three thousand acres in the immediate vicinity of the cavern, from their apprehension that on the land which they so acquire another gateway might be found. They realize, I have been told, from fifteen thousand dollars to twenty thousand dollars per annum from the fees (two dollars each for the short, and three dollars each for the long route) charged inflexibly to every tourist. They might make more than twice as much by putting up a good hotel, building a railway to Cave City, and dealing fairly with travellers. Numerous capitalists have tried in vain to buy the cave property; but its owners, or the executors, will not sell. They refuse themselves to do anything for the benefit of the public, even when their interest prompts, and they refuse to allow anybody else the desirable privilege. This cannot very long continue, however. Time removes hunkses as well as difficulties, and cures meanness by putting it under ground.

The region about the cave is very high, — four hundred feet above Cave City, — and is said to be superlatively salubrious. The neighborhood is very sparsely settled, but dwellers in it, according to popular report, are compelled to move away when they wish to die; and hence it happens that wealthy old uncles and disagreeable mothers-in-law are always informed that Edmonson County is one of the most unhealthy localities on this continent.

Game, such as quail, rabbits, wild turkey, and even deer, is abundant there, which, with the good fishing in the Green River, less than a mile distant from the public house, should recommend the vicinity to sportsmen, and would unquestionably, if the accommodations were what they ought to be. As it is, most visitors get so vexed with the obnoxious arrangements appertaining to the Cave that they hurry off after exploring it, and seldom go back. Even their memories of its grandeur are infected with the Little Peddlington spirit

...n. He has been a guide for a quarter of a century; ...born on the spot, and has never been twenty miles be... the limits of the county. He is naturally intelligent, ...h he can neither read nor write; but he makes up for ...slight defects of education by his skill with the rifle. ...regarded as one of the best shots in Kentucky; has a ...and children, and a small farm; receives fifteen dollars a ...; does not know that the world is round; believes ...in Kentucky, is the capital of civilization, and is, on the ... as contented a mortal as I have ever met.

...ddition to the short and long routes already mentioned, ...reat cavern has a vast number of avenues and branches, ... of which remain as yet unexplored. All these ramifica... taken together, would give a length to the cave it is ... of nearly three hundred miles. Its temperature, all the ...ound, is 59° Fahrenheit. The interior air is believed ... much purer than that of the outer world, and, on ac... of its elasticity and sweetness, to be remarkably invig...g. There seems some foundation for this opinion, inas... tourists can make much more exertion, and endure ... more fatigue, in that underground region than they can ... ordinary surface of the earth. I have observed weak ...nd delicate women perform acts of pedestrianism which ...hed themselves, and of which they would be incapable

My last visit to the cave was during the spring of 1870. Early as the season was, I found at the hotel about a dozen persons bent on the same errand. Seven or eight of them were anxious to traverse the long route, and as that was my purpose also, we rose betimes, and prepared ourselves for the journey. There were several ladies in the party, and they were obliged to part with their hooped skirts and city attire, and put on water-proof cloaks, with the simplest possible arrangement of their hair and toilet. We tyrants of the race donned some old clothes, heavy boots, and caps, each taking a lamp attached to long wires, so that we could hold it easily and swing it as we walked along. Our conductor, who was no other than Sam Meredith, looked very carefully after our lamps, to see if they were properly supplied with oil and properly trimmed, since the consequences of having one's light go out in those desolate chambers, and of being left in awful solitude and darkness, — perhaps forever, — are in no manner pleasant to contemplate. At different parts of the cave, small tanks of oil are kept, from which the lamps may be replenished in case of accident, and these have proved to be invaluable in numerous instances.

Eight o'clock in the morning was our hour for starting, and though we had become acquainted the evening previous, we were so changed in appearance — thanks to our simple attire — that we were scarcely able to recognize one another when we assembled for the march.

The masculine excursionists had not undergone such a metamorphosis as our feminine friends, whose mothers would have been excusable for not knowing them in the Spartan severity of their costumes. One young lady, whom I had thought quite pretty, was anything but pretty in the absence of her usual chevelure and modish robes. Another girl, still in her teens, who had appeared decidedly plain, really shone with comeliness and grace in her water-proof and generally dishevelled state. Her common raiment so set her off that I was obliged to conclude that none of her personal charms depended on her wardrobe, and that the less she wore the lovelier she seemed.

A bright and intellectual widow, to whom years had brought breadth of figure in which Hogarth's line of beauty could not be traced, looked positively grotesque in her unique garments. Agility acknowledged no kinship with her, and symmetry was unquestionably of alien blood. She expressed, from the beginning, her scepticism as to her endurance, and particularly inquired of our rustic tugleman if she could rest a little on the way, provided she should happen to be spent. As we set out, she evinced a lack of physical elasticity and heaviness of movement that foreboded ill to her success. But for the gallantry due to all her sex, I should say she waddled, and presented such a figure that, if Cruikshank had caught a glimpse of her, he would have claimed her for his own.

We were off at last, and in a few minutes were before the mouth of the mighty Kentucky marvel. There is nothing remarkable in the mouth, which conveys the impression of a decayed and abandoned culvert, and such I should take it to be, had I not known otherwise. The path by which you enter is damp and slippery, unless in very dry weather, and the opening of the cavern promises none of the wonders that the interior reveals.

After going less than a hundred yards, we lost the spot of daylight which the mouth furnished, and were wrapped in such shadows as might have marked primeval chaos. Our little lamps displaced so small a part of the thick darkness that the vast volumes which remained grew blacker than ever. The air was so full of oxygen as to be sensible at once, and I could not help but notice an inflation of my lungs and a lightness of my limbs, such as one feels on mountain-tops. My spirits rose rapidly, and my mood grew involuntarily hilarious. I jested constantly, I laughed at the smallest trifle. Buoyancy was in every breath, and a mercurial quality, by a strange paradox, in the surrounding gloom. The cave, if not delightful, was exhilarating in the highest degree, and I fancied it would be agreeable to spend nights there. I should say days, if the word did not convey an impression of light. The effect of the place on me was entirely different from that

of the Paris Catacombs, owing, doubtless, to the oxygenated air. The peculiarity of my temperament, however, which, by a principle of antagonism, reflects the opposite of surroundings, must have had something to do with it. Society which is considered the gayest oppresses, and graveyards enliven me. It is not strange, therefore, that the Mammoth Cave, apart from its atmosphere, should animate my spirits.

We noticed that the walls and roof of the cavern were frescoed with bats hanging by their claws, heads downward, though some of them were flying nimbly about in the darkness, evidently disturbed by the glare of our torches, and the noise of our speech. During the winter they assemble there in such quantities that the curves of the cave are black with them. Their flitting through the thick gloom, relieved only by the flare and glare of the lamps (added to the hollow and dreary echoes awakened by our voices, and succeeded every few moments by an oppressive stillness), made those vast limestone chambers appear so dismal that the women of the party declared they should go mad if forced to remain in them for any length of time.

Very soon we came to the remnants of a number of rude habitations erected in 1845, and inhabited by certain consumptives who had been recommended to try the equable temperature and pure air of the tunnel, with the hope that their lungs might be healed. The poor patients had high expectations from living there, and though their first experience was not favorable, they remained several months, unwilling to believe that they would not be ultimately helped. The longer they remained, the worse they grew. After a while their faces became livid; the pupils of their eyes expanded, and darkened until the iris was invisible, having the appearance of two spots burning above a deathly pallor. They lost every particle of flesh; crept gloomily about, coughing so hollowly as to suggest the sound of the first earth falling upon a coffin-lid; and added to the natural dreariness of the vault a hundred-fold. Everybody saw and knew that they were tottering on the brink of the grave; and yet, such was their hope — a distinct

and inseparable accompaniment of the disease — that they could not be persuaded to quit that purgatory. They even imagined they were improving, and insisted that they were stronger, when they could not drag their leaden limbs after them.

The preciousness of existence (to most persons) was strikingly illustrated in those poor consumptives who had no hold on life, and still could not be resigned to death. One would think that serious trouble with the lungs would disarm the grave of most of the terrors it is popularly supposed to have (those who have had much familiarity with death are aware that this is an error), since it destroys all physical comfort, and all mental peace. And yet quite the contrary is true. Generally, no man is so unwilling to order the undertaker as the man who has long suffered from consumption, which shows how inconsistent and unreasonable human nature is, especially after it has been badgered by doctors and dosed with drugs.

Finally three or four of the consumptives expired in the cavern, — there were nearly twenty of them in all, — and the remainder having it borne in upon them that neither consumption nor the Mammoth Cave could insure immortality, they consented to be removed. Every one of them died — if they could be considered to have been in any true sense alive — within a few weeks after their return to the sky and the sunlight. But the history of their residence in those dreary chambers will be remembered for generations, and in 1873 will have become one of the traditions of the cave, so altered and exaggerated that very few of the positive facts will be left or allowed to mar the poetic and romantic version then current.

The cavern varies greatly in width and height, and so many avenues branch off from it, that it would be almost impossible to thread your way without a guide. A large part of the passages have been explored at different times; but some of them are virgin yet. The majority of the branches end on the bank of the river, and it is very strange that new mouths to the tunnel have not been discovered. It is not improbable

that they have been; but the owners of the property, as I have said, are so fearful of suffering from a rivalry in the show business that they would be the last to disclose any such fact. Different quarters of the cavern are differently named, according to their actual or fancied resemblance to the titles they bear. It requires a deal of imagination to trace the similitude sometimes, though at others it is apparent at the first glance.

The Methodist Church, one of the first localities of note, is a semicircular chamber, in which a ledge of a rock represents the pulpit. Theological service has been performed there, and the logs brought in for seats are still in perfect preservation, though they have been there more than half a century. More recently service has been improvised by enthusiastic itinerants of the Methodist creed, who, having heard that the groves were God's first temples, may infer that caves have an equal fitness for divine worship. The imagination on which religious fervor so largely depends could not fail to be kindled by burning tapers, swelling music, and earnest appeals in those natural aisles and chancels, nor could they do other than remind the pious participants of the primeval Christians who fled to caverns and to catacombs that they might adore their Creator in secret, and be preserved from persecution.

Just beyond the church is a figure of gypsum on the roof, a sort of bas-relief called the American Eagle. Patriotism prevents me from indorsing this symbolic bird, which, whatever it may have been originally, is now sorely shorn and shattered. One leg, a wing, and part of the body are literally relieved, being no longer visible under the light of a dozen lamps; and the entire animal is so deranged that it might as well be styled a dromedary or a griffin. The American eagle is usually on such admirable terms with itself that I am confident this bird would be ashamed to pretend that it is what it is represented to be. If it be an eagle, I will be sworn it does not know it. I choose to consider it a unicorn, since a unicorn is a fabulous beast, and may be presumed to resemble anything, even that amorphous gypsum figure on the roof. If the like-

ness cannot be traced by ordinary observers, they may be reminded that it consists in the— or more properly in a — horn.

Minerva's Dome is remarkable for its fluted walls and a honeycombed roof, though why it should be devoted to Minerva, who is not herself present in any form of natural sculpture, is an enigma not to be solved. The probability is, that Kentucky orators have so constantly referred to Minerva springing full-armed from the brain of Jove, that the goddess, even if she once had her image there, has removed it, lest its sight might induce the five or six public speakers in the state who have not used the time-honored simile to force it into their next brilliant effort.

Near the Dome, those who wish to traverse the short route only, branch off, while the long route is continued until the cave contracts, and Fat Man's Misery is reached. This is a passage through the rocks so very narrow that a man of average proportions is compelled to go sidewise. It must have been worn by a stream of water in the dim ages past; and now the only stream of water visible is that which flows down the sight-seer's face, as he toils along, and crawls through the Valley of Humility, where the roof is so low that you are obliged to bend nearly double. Persons with weak backs, or inclined to lumbago, have to return here with the fleshy people who have surrendered at the Fat Man's Misery. The Great Relief is a broad passage, a little farther on, where tourists bring themselves to an erect position once more, and mop their brows with their handkerchiefs, so frequently brought into activity during their arduous journey.

There are numerous streams in the cave, the chief of which have been christened the Echo and Roaring Rivers, the Styx and the Lethe; the last often called Oblivion, because the unclassical public is resolved to pronounce the Greek title as if it were a monosyllable. The Echo River is renowned for its echoes. It is much larger and more striking than the other streams, and when it is high, as it usually is in the spring, it is difficult to cross. When I last made the passage, I had to lie almost flat in the little boat to get under

the shelving rocks, and, only a few days before, the guides had to stop there in consequence of the swollen stream. After we had rowed out a little way, we shouted, and called, and sang, and had the pleasure of hearing our words come back to us again and again, with almost perfect articulation. Even the tone of the voice and the emphases are preserved, and I could scarcely believe sometimes that persons were not concealed, and repeating our phrases. The thick darkness, and the weird aspect of the cavern at that point, aid the fancy, and stimulate the feeling of superstition, said to exist, more or less, in every human breast. Two hundred years ago, countless witnesses might have been found to tell of hobgoblins and demons they had heard with their own ears, and seen with their own eyes, too, in the ghastly vault.

The Roaring River does not roar much, — indeed, not at all, — and is not especially noteworthy. It is a dark and turbid stream when it is high, though at its lower stage, it is as clear as any of the south-western waters. We rowed over it, as we had rowed over the Echo River, our little scow being as inconvenient, awkward, and dirty as its fellow.

The Styx flows about a hundred feet below the floor of the cave, and is passed by a rough wooden bridge. We could hear the murmur of the stream below, and tried, with the aid of our lamps, to see it. We did not succeed until the guide attached two or three of the lights to a long pole, and let them down over the bridge. Then we saw a great fissure in the rock (manifestly made by the water), the walls of which are tolerably smooth. The borders of the chasm were so slippery that great caution was necessary to prevent one from falling into the yawing gulf. Near the Styx is the Bottomless Pit — a nominal no less than an actual hyperbole, because it has a bottom not more than one hundred and seventy-five feet from the spot were we stood. We peered down into it as best we could, and concluded that it merited its title in point of gloom and dreariness.

Until within a few years the pit had never been descended; but several enterprising and rapid Kentuckians, who had done

thing to distinguish themselves, thought they would render their names historic by becoming acquainted temporarily with the region which, they feared, they might know permanently in the future. They went to the spot well prepared with lights, ropes, hooks, and ladders; but the place looked so ugly that only one of them had the nerve to go down. He came within an ace of breaking his neck several times before he was lowered to the base, where, after groping about for half an hour, and finding nothing but rough rocks, he expressed a desire to be pulled up again.

This was easier said than done, in consequence of the difficulty of managing the rope. On his upward passage he was thumped against the walls, and cut by sharp ledges, until he was exhausted, more from terror and pain than from loss of blood: and finally he was dragged to the top, just as the rope, in several places, held only by a few slight strands. He did not recover from his wounds and the shock to his nervous system for a long while, and he frequently asserted that he would not repeat the excursion for any consideration under heaven. He never recovered, I may say, from the indirect effect of his exploit; for it gave him a certain local notoriety, and he nourished his fame on such generous quantities of Bourbon whiskey, known in the state as Kentucky wine, that, after several brilliant seasons of imbibition at Frankfort, the delirium tremens and two undertakers took him to his eternal home.

Since then, the descent of the Bottomless Pit has been made not unfrequently, one of George D. Prentice's sons having performed the feat, and furnished a two-column article of sophomoreal extolment thereon in the Louisville Journal.

The Lethe has steep and rocky banks, and as we floated down its current, through the almost tangible darkness, with our flickering torches and the hollow murmur of our voices, it really seemed as if we might be disembodied spirits on the sad Plutonian shore. When we ceased to chatter, the dropping of water through the roof into the stream, and the dip of the oars, broke the silence with strange impressiveness.

Sam Meredith was not musical: but I remember on a pre-

vious occasion, that our ancient sable guide treated me to a dirge on the flute, while we glided over the bosom of the river of oblivion. The effect was magical; the solemn strains were so in keeping with the sombreness of the surroundings, the flame of the torches was so weird and fitful, the faces of the tourists looked so pale and wondering, and the ebony player assumed such an impishness of form and feature, that I should not have been in the least astonished to meet, sailing along in another boat, spirits long departed from the world.

Would it had been Lethe indeed! How gladly I should have drank of its waters! how willingly have forgotten the earthly life and all its sorrows, including the bad breakfast I was to get at the hotel the next morning, and the boredom I was doomed to encounter for the fortnight to come!

On the long route the most noticeable localities are the passage of El Ghor, a long, narrow, covered causeway; the Brown Chamber, so called from the color of its walls, and its square, apartment-like shape; Martha's Vineyard, the roof of which resembles clusters of grapes cut in marble; Snow-ball Grotto, showing a remarkable likeness to sculptured (floral) snow-balls overhead; the Rose Chamber, a fine counterfeit of roses in rock; Silliman's Avenue, a narrow gallery so regular that it might have been the work of engineers; and numerous chambers of different proportions, and marked by striking geological features.

The Maelstrom is an ordinary pool containing an eddy and a great disappointment at the same time. It is no more of a sham, however, than the famous (fabulous) whirlpool off the coast of Norway, which was supposed to carry down ships and whales, and which in reality is not perilous to vessels or even small open boats, except during winter and in time of violent storms.

The Rocky Mountains, the end of the long route, extend about a mile, and are nothing more than an extremely rough surface detrimental to the physical comfort and shoe-leather of those going over them. Women seldom attempt this passage, which has little to commend it except the difficulty

the execution, and the probability of fatigue in its accomplishment.

I should have mentioned the celebrated eyeless fish, peculiar to the Echo and other rivers. They have been the cause of many scientific theories and speculations among *savans*, who have deduced from them either that Nature does not furnish organs which are of no use, or that organs unemployed cease to exist. Abundant as the fish are, it is difficult to catch them, and I was considered extremely fortunate because I secured three or four in as many minutes. I gave them to a man who had dabbled somewhat in science, and he was very careful for the present. I told him he need not be, for I should rather have half a dozen brook trout or a Spanish mackerel for breakfast than all the eyeless fish the Mammoth Cave contained. These sightless little creatures, generally about four inches long, resemble ordinary minnows, though of a rather darker hue, and more inclined to translucency.

'The short route,' the Giant's Causeway, the Gothic Chapel, the Grand Dome, and the Star Chamber, especially the last, have the most reputation and attract the most attention. The Causeway receives its name from its likeness to the Causeway on the coast of Ireland, and the likeness is considerable, as I can testify by actual observation.

The Chapel is striking and picturesque, albeit there is no more reason to call it Gothic than Doric or Ionic. It closely resembles a chapel, and I should fancy Nature might have been in an ecclesiastico-architectural mood when she formed it.

The Grand Dome is seen through a large opening in the hill, and shows to great advantage, being about one hundred feet below the ordinary level, and one hundred feet above, and possessing a vastness and majesty to which few other parts of the cave can lay claim.

The amount of rhetoric the Star Chamber has given rise to is beyond calculation. It has supplied innumerable similes, and has been discoursed upon in every language. The chamber is some seventy feet high, and the roof is composed

of crystal of gypsum, and black oxide of manganese. As soon as we entered the Chamber, the guide took several of our lamps, descended into a hollow in the rock, and threw the light therefrom upon the ceiling. The effect was wonderful. The light, striking upon the crystals of gypsum, made them look precisely like stars, and — all the lower part of the vault being in deep shadow — created so complete an illusion that I could hardly doubt but that I was standing under the evening sky. Never was space so elongated. Those seventy feet seemed immeasurable. The longer I gazed, the more the shining ceiling appeared like the heavens. I could scarcely believe that I was under ground, and that the green grass and trees were growing above my head. I was completely lost for a while, just as any one will be after a long and earnest contemplation of the stars; and when the guide stepped out of the hollow with the lamps, and changed the scene entirely, I felt as if I had been awakened from a dream. My companions were unreserved in their expressions of astonishment and delight, and "beautiful," "splendid," "magnificent," "marvellous" were the adjectives that dropped momentarily from their lips. The Mammoth Cave would be well worth visiting, if its only wonder were the Star Chamber. I have seen it a number of times, and each time its beauty is greater, and its illusion more complete.

The dimensions of the cave find their extremes in the Fat Man's Misery and the Grand Dome — the former not more than twelve inches wide, and the latter over a hundred feet. The height varies quite as much. The Valley of Humility, where one is obliged to make a crawling L of himself, is offset by the loftiest rocky chambers; and the frequently smooth limestone floor is diversified by streams, ledges, and roughnesses culminating in the so-styled Rocky Mountains. What the cave lacks more than aught else is stalactites and stalagmites, though these are found well represented in the Gothic Chapel. The great cavern is noted for its variety, having nearly all the remarkable features that characterize other celebrated caves. It is no less attractive to the ordinary

VIEWS IN MAMMOTH CAVE, KENTUCKY

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...t-seer than it is to the naturalist, the geologist, or the ...rd lover of science. It appeals to every taste — to that ...the poet and of the philosopher, of the curious and the ...ssaic, of the reverent and the sceptical, of the worldling ...the mystagogue.

...ow did your party come out? The masculine portion of ...ry much as it went in, except that some members com...ned very bitterly of fatigue. The feminine portion suf...ed in various ways. The young woman who had been ...ged for the worse by the cave costume, grew homelier ...homelier every mile she went, and so disenchanted her ...diate companion — he was her lover, I think — that after ...excursion he ceased to regard her with fond and favor... eyes.

...The other young woman, who needed not the foreign aid of ...ament, steadily improved with fatigue, drippings of water, ...d -plashings of mud. If she had fallen into the Styx or ...the, and then been drawn for half an hour over the floor of ...e cave, I have little doubt she would have appeared charm...g. I never knew one of her sex to make such aesthetic ad...ces under adverse circumstances.

...The plethoric widow gave out a dozen times during the ...rney, detained us materially, and was at last left behind, ...company with a sympathizing friend, until the rest of us ...d retraced our steps, and literally taken her up again. She ...clared that she never would be able to get rested; and two ...eks after her journey I heard she was still an inmate of the ...el, bemoaning her fatigue and disordered nerves.

...Persons have been lost, from time to time, in the cave, but ...nearly so often as has been reported. Some years ago, ...of a party who made the exploration disappeared in the ...Chamber, and all effort to find him proved abortive. ...en they went back to the hotel, the greater part of the ...ables belonging to the excursionists, which had been ...osited with the landlord, had faded out of sight. In...igation established a close connection between the disap...ance of the man in the Star Chamber and the watches

and jewelry. The fellow was, unquestionably, a profes thief, but had pretended to be a clergyman from St. J After the party had set out, he hurried back to the hous informing Bouiface that the ladies and gentlemen had al their minds, and preferred to take their valuables with the latter was unsuspecting enough to hand them over. pretended divine rejoined the excursionists, kept his counsel, and consulted his interests by disappearing fro Star Chamber when the lamps had been removed.

In 1835 two men from Bourbon County, Kentucky,— appearance indicated that they had for a long time qu the fiery beverage of that region, — arrived at Bell's Ta and declared that they could go all through the cave wi a guide, and come out safely. They even laid wagers to effect, and though they were warned against such folly, started upon their expedition. They certainly went in they have never come out; and as thirty-seven years elapsed, it is highly probable they have deferred their r indefinitely. It is supposed that they got lost in some o windings off the main route, and starved to death.

In the summer of 1840, a middle-aged lady from B suddenly swooned from fatigue, while making the u ground journey, and sinking to the earth in silence, th mainder of the party went on without missing her. On way back, the guide observed her sitting on a stone, chi ing to herself like a monkey. The poor woman had be insane. Recovering her consciousness, and finding hers the darkness, — for in her fall she had extinguished her l — she had believed herself lost, as it is supposed, and terror had shattered her intellect. The excursionists ha been absent two hours; and yet that brief time was suffi to destroy her reason utterly. She never recovered, and two years after in the Worcester (Massachusetts) Insane lum, a raving maniac.

To be lost in the Mammoth Cave would be enough to turn the strongest brain, since, with all its beauties and ders, it has capacities for terrible tragedy and ine horror.

XXXII.

INSURANCE AND ITS MYSTERIES.

HISTORY OF FIRE AND MARINE INSURANCE. — LIFE INSURANCE. — OBJECTIONS OF A CALIFORNIAN. — HOW HE ANSWERED AN AGENT. — FRAUDS UPON COMPANIES. — A DEEP-LAID SCHEME. — JOHNSON AND HIS THIRTY THOUSAND DOLLARS. — OPENING A GRAVE. — A FICTITIOUS CORPSE. — PURSUIT BY DETECTIVES AND CAPTURE OF THE SWINDLER. — LITIGATIONS ABOUT INSURANCE. — CHINESE TRICKS ON AGENTS. — SUBSTITUTES FOR EXECUTION.

THE system of fire and marine insurance has been in use for centuries. The Chinese claim to have invented it, as they have claimed nearly everything else; but the probabilities are, that it was of western origin. It is alluded to in the English laws about the middle of the thirteenth century. Its earliest form was in that of marine insurance: afterwards the system of fire insurance was invented. Still later came insurance against death, which has grown in recent years to very great proportions.

Many people are unable to understand how insurances can be effected against an event which is sure to happen. There is a story of a man in California who was approached by an insurance agent with a request to take out a policy on his life. The agent painted in glowing colors the advantages of insurance, and the man listened to him very patiently. When the agent had finished his story, the other said quietly, "Stranger, I have lived in this here country twenty-five years. I have bucked against nearly every game that they have ever brought out, but I'll be hanged if I want to play at anything where I have got to die before I win."

THE objection which this individual made against insuring

his life, was a very natural one, and is an objection made by many people, though in a different form. The insurance companies, some of them at least, meet this objection with a plan by which a man arriving at a certain age without dying, can draw the money that would come to his heirs in case he died before the specified age was attained. They have devised other plans to meet the objections of all classes of people, and it is safe to say, that the system of life insurance is about as near perfection as it is possible to bring it. It is a question whether, in many cases, the companies do not reap a much larger advantage than is their just due. It is noticeable that the companies, as a general thing, pay enormous salaries to their officers, erect costly buildings, pay heavy dividends, and have a good time generally. The conclusion is natural that the rates of insurance are altogether too high, and the advantages are much greater for the companies than for their patrons.

It is possible, sometimes, for dishonest men to defraud the insurance companies, though it is not always easy. The companies are generally on the safe side; they require the most positive proof of the death of a person whose life has been insured, and they throw a great many obstacles in the way of the collection of the amount of the insurance. I have known them to demand one certificate after another, and compel the person who was endeavoring to collect the insurance money to make ten or twelve visits to the office before meeting his just demands. Very often, after the death of an insured person, questions are raised which were never before mentioned. The premiums may have been paid for years, and the officers of the company claim to make a discovery that relieves them from all responsibility. In some cases their action in this respect is just, but in many others it is about as unjust as anything that can well be conceived. It would seem proper that where a person has been accepted for insurance, and the premiums on the amount of money called for have been regularly paid and received without objection, no objection should be raised after the person's death.

Some interesting stories are told of the way in which insurance companies are sometimes defrauded. One was told to me by the secretary of a prominent company in New York, which indicates great ingenuity on the part of the swindler.

"One day," said the secretary, "a man called at our office, and said he wished to effect an insurance of ten thousand dollars on his life, and was ready to submit himself for immediate examination.

"The physician of the company was called in, and made a careful examination of this man, whom I will call Johnson. Johnson was pronounced a good subject. All sorts of questions were asked, and he answered all of them satisfactorily. He was closely inspected. His limbs were pinched, and his chest was thumped in the orthodox way, but no defect could be discovered. To all appearances he was good for threescore and ten, and possibly more. He gave us references, stated that he was a clerk in an up-town house, and his statement was fully verified. I called upon his employer, inquired about his clerk, and was told that his character was of the best, and that he was a very industrious and strictly temperate young man. We were satisfied, and insured his life for the full amount.

"In a little while he made a request to be permitted to travel west, and of course we granted it. His parents lived in a small town in Connecticut. He had married in New York, and had been married for three or four years. Occasionally he took his wife on a brief visit to his old home. He went west soon after his application, and we lost sight of him. His wife accompanied him, and he announced his intention of finding employment and settling in one of the western cities.

"Six or eight months after his departure, his wife telegraphed to her friends in the east that her husband was very ill with pneumonia. Two days later she telegraphed that he was dead, and that she would bring the body to Connecticut for burial.

"In due course of time she arrived, dressed in deep mourn-

ing, and evidently suffering from deep grief. The funeral was held, his parents attended, the coffin was opened, and the features were visible through the glass plate, though they were much dimmed by the moisture which collected on the inside.

"A few days after the funeral, the widow, whose name had been inserted in the policy at the request of her loving husband, called at our office, presented the proper papers, and made the necessary application. We made an investigation, were satisfied that everything was correct, and paid over the money.

"We lost sight of the widow after that, but learned casually that after a short residence in New York she had gone to California.

"We happened to learn also, soon after, that the same man had insured his life for ten thousand dollars in another company, a Massachusetts one, having an agency in New York; and also in a Hartford company for the same amount. Of course this naturally raised our suspicions. The premium on thirty thousand dollars is a very heavy one for a man on a clerk's salary, and we became convinced that all was not right; so we began an investigation.

"We saw the merchant that had employed Johnson while in this city, and learned that the young man went west at the time indicated. The merchant had heard of his death, but had no positive proof or knowledge of it. Then we went to the village in Connecticut whence Johnson had hailed, and though we made the most searching inquiries, we could learn nothing to confirm our suspicions. His parents were positive of his death. Had they not seen his widow? and had they not seen his features through the glass plate of the coffin? and had they not seen that coffin buried in the public cemetery? To their minds everything was perfectly straight, and they were indignant at our supposing that there might be something wrong.

"I had a suspicion that the body in the coffin might be a 'dummy' with a wax face, in imitation of the features of

nson. So I hired the sexton in charge of the cemetery pen the grave and allow me to examine the interior of the n. We did the work at night, and unknown to Johnson's nts, as we knew they would be greatly offended if they ned what was going on. But I was doomed to disappoint-nt, as the corpse proved to be genuine, and as good a one ever was buried. Plainly I was on the wrong scent when elving for a body of straw and a bee of wax.

"The three companies agreed to work in concert, and share expenses of an investigation into the whole affair. We a detective to the city where Johnson had died, and after ttle inquiry he ascertained that a man answering to the e of Johnson, and the proper description, had actually d in that city. His body had been sent to the east, and was all that was known; but it was ascertained that in-ead of dying of pneumonia after a few days' illness, the n had lingered some time with a disease strongly resem-ling consumption. Here was a clew which we determined follow up.

"As the widow had gone to California, we told the detective follow, and trace her out. She had written no letters to the parents of her dead husband, except a single one an-nouncing her arrival at San Francisco, and giving a brief de-scription of her overland journey. She said she had friends ving near San Francisco, and she expected to reside a short me with them; perhaps she might remain in that place hrough the winter, and perhaps not; could not tell; would rite again.

"The detective had a long search for the widow, and visited very place around San Francisco, and even advertised for e missing Mrs. Johnson. His advertisement stated, after scribing her in sufficiently explicit terms, that by sending note to a certain address she would learn something to her dvantage. This was not exactly true, as she would have arned something greatly to her disadvantage, had the detec-ive been able to find her; but in the pursuit of criminals, it s generally considered proper to tell a few falsehoods in rder to serve the ends of justice.

"One day the detective visited a ship which had just come in from the Sandwich Islands. He went there with an acquaintance who knew the captain, and was invited on board. While they were in the cabin enjoying the captain's welcome, the detective heard the ship's steward telling a friend, who had called to see him, something about their last voyage out. He said there were a lady and gentleman, very nice people, who occupied a state-room, which he indicated, and who seemed to be very fond of each other. 'They had a good deal of money with them,' said the steward, 'and they were pretty liberal with it, though they would never allow me or anybody else to go into their state-room, unless one of them was there. They had their money in a small trunk, which they kept under the lower berth; and whenever they were both out of the room at the same time, they always carried the key with them.

"'When their room was fixed up in the morning, one of them always stood near the door; and if we wanted to steal ever so much, we would not have had a chance. To make everything sure, they had a spring-lock on the door — a lock they brought with them, and fixed there with the captain's permission. They were not going to have anybody get into their room with a pass-key.'

"The steward went on to describe the couple, and the detective found himself interested. So he questioned him very closely, and became pretty well satisfied that the gentleman was the veritable Johnson who was supposed to be dead and buried some months before in Connecticut, and that the lady was the disconsolate widow who had drawn the money from the insurance company.

"Here was a dilemma; the captain and steward only knew that their passengers had gone to Honolulu. They sailed not under the name of Johnson, but under the very rare name of Smith. John Smith, I believe, was the gentleman's name, while the lady was Mrs. John Smith. It is not easy, as everybody knows, to trace out a man bearing this name; and even if he could be traced, very little good could come out of it, if

were in one of the South Pacific Islands, or, in fact, in
e where our extradition laws could not reach him.
e we were about it, we thought it would be well to
e whole truth of the matter; and so we sent the de-
down to the islands, and told him to follow them up,
e uske it expensive. He went to the islands, and
and that the parties had gone to Australia. Then he
Australia, and traced them to New Zealand, and in
land he found that they had gone, according to the
his information, in about three different ways; so he
k to Australia. After a long and vigilant search he
m in Melbourne.
ad no authority for the arrest and detention of Johnson,
e made him believe that he had, and frightened him
ng up half of the money he had fraudulently obtained,
ition that he should not be further troubled, and on
ition also that he should tell the whole story of the
shment of his fraud. As long as we could not get
w, we thought his story would be an interesting one,
ld serve to put us on our guard in future. The de-
obtained what he believed the whole story, and with
ey Johnson had returned he made his way as speedily
ble to New York.
deception began at the very outset of the scheme.
mind that the man's name was Johnson, that he was
town in Connecticut, had married his wife in New
nd was in the store of a merchant of the great me-
. There was a clerk in that store by the name of
, and he was from Connecticut; we will say Smithville.
married in New York about four years before this oc-
e. He was a steady, well-behaved man, and contem-
going west. His wife had a small amount of property
own name, but she was not personally known to the
nt, and the merchant did not know that Johnson hailed
Smithville. There was another clerk in the adjoining
hose name was likewise Johnson. For convenience in
ing the two men, I will call the second one Roberts.

He came from Brownsville, in Connecticut. He had been married about four years. He was a fast fellow, and rather unscrupulous, though his employer did not know that he was in any way dishonest. The two clerks had become acquainted by accident.

"When Roberts ascertained that Johnson conceived the idea of going west, he (Roberts) laid a plan for swindling somebody. His wife was as unscrupulous as himself, and so she entered into the scheme. Roberts was of vigorous health, and could pass an examination with a life insurance company without trouble. He was of the height, complexion, and general appearance of Johnson; and this fact, added to the other coincidences greatly favored his scheme. So he came to us, and obtained the insurance, as before stated. When we made the inquiry of the merchant, his answers were satisfactory, and all the references were exactly as he stated them.

"His plan worked completely. He waited patiently until Johnson went west, and then he went likewise. He did not, however, go to the same city.

"He explained that it was his intention, a month or two after his arrival out west, to obtain from a body-snatcher a corpse which would answer his description, and then his wife would send the proper telegram to her friends in the east, and proceed there with the remains, which would appear to be those of her husband.

"Fortune favored his scheme more than he had anticipated. At a boarding-house where he was temporarily lodged, he found that a boarder named Johnson was in very bad health, and not expected to live. Affecting an interest in him, and claiming to discover a relationship, he tended him carefully until the time of his death. The detective had a suspicion that the sick man was helped along, but of that there was no proof. Immediately after the death of the invalid, the telegram was sent, and the wife proceeded east, as before related. She had been at one time an actress, and was very good at simulating grief. She deceived all the relatives of her husband in the most complete manner. They thought her bowed down and broken-hearted with grief, when all the time she

as doubtless laughing in her sleeve. The honest Johnson, whose name had been used without his knowledge or consent, was found, after the detective's return, to have lived at St. Louis, the place to which he had first emigrated, and had gone thence to New Orleans. He was much surprised when he learned what had occurred, and positively damned over having an insurance on his life, or on that of anybody else. I suppose the swindler Johnson is still in Australia, and trust that he will end his days there in peace and quiet — though I fear his success in this instance will embolden him to some other fraud. His operation was fairly, though not exceedingly profitable, as, after deducting the premiums for the first year of insurance, the expenses of his expedition, and the money he returned, he did not net more than ten thousand dollars by the operation."

Some of the insurance companies insert in their policies a announcement that the policy becomes void if death results from execution on the gallows, or in any other legal way, or from suicide. On one occasion a man whose life was insured was killed in a duel, and the company refused to pay the policy, on the ground that the man died virtually by his own act. His adversary was known to be a dead shot. The lawyer of the company, after stating all the arguments to show that a man who goes a duelling is, for all practical purposes, a suicide, clinched his argument by declaring that a man who would go out with such an adversary might know beforehand that he would be killed, and therefore his death was voluntary. I believe the court did not sustain the claim of the company, but required the amount named in the policy to be paid to the heirs of the unfortunate duellist.

I have heard it argued by insurance men that, where a person insured takes to hard drinking, and dies from the effects of rum, he dies by his own hand, and the suicide clause exempts the insurance company. In some cases, I believe, this claim has been sustained; but it is now generally disregarded. A few cases have occurred in the United States where men have insured their lives for the benefit of their

families, and have then deliberately killed themselves. The insurance companies, in those cases, have resisted the payment of the claims; but, I believe, they have been generally, though not always, allowed.

There are some countries in the world where an insurance company would be ruined in a very short time, if it paid the insurance claims of men who kill themselves. In China, for instance, let a company start upon this basis, and it would do a flourishing business for a short time. Men in China are much more ready than others to die for the benefit of their families or themselves; and a Chinese who could make a good thing by killing himself would be sure to do it. A company doing business in the way I have just stated would find, some pleasant morning, that about half of its policy-holders were dead, and the other half were making their preparations for blotting themselves out of existence. The Chinee loves his family, and would think he was doing a nice stroke of business by insuring his life for their benefit, and then, quietly bidding them good by, "handing in his checks." If he could effect an insurance for a thousand dollars, he would spend a hundred in having a glorious spree, and leave nine hundred dollars to his afflicted widow.

The indifference of the Chinese to death may be well illustrated by an allusion to the substitute system, as practised in the Celestial Empire. Persons condemned to death for certain offences are allowed to die by a substitute. This would be utterly impossible in America, as one could nowhere buy a substitute who would be willing to die for a stipulated sum; but in the Celestial Empire it is easy enough to find a man who is ready to take the place of one accused of a crime and ordered to be executed. The real culprit sends a friend to make the negotiations. The broker can find a man for about six hundred dollars, half down, and the balance on the fulfilment of the contract. The cash is paid, and the time fixed for the execution, both of the contract and substitute. With the money in hand, the substitute assembles his friends, and they have a right royal spree. Everybody gets blind drunk

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on sam-shoo or opium, and when the money is all expended, the substitute bids farewell to his friends, and delivers himself up for sacrifice. He is led to the place of execution, where he drops on his knees. His head is bent forward, the executioner's sword whizzes through the air, and the substitute is a head shorter by the operation. The culprit, who has thus satisfied the law by proxy, pays over the balance of the money to the widow of the departed; everything is lovely, and everybody is happy.

XXXIII.

RAILWAY TUNNELS.

TUNNELS AMONG THE ANCIENTS. — HOW THEY WERE MADE. — MODERN TUNNELS AND THEIR LENGTH. — LAUGHABLE INCIDENTS IN RAILWAY TUNNELS. — THE TWO LOVERS. — THE ANXIOUS FRENCHMAN. — ROBBERS. — THE HOOSAC TUNNEL. — ITS HISTORY. — THE AUTHOR'S VISIT. — NATURE AND PROGRESS OF THE WORK. — AN EXPLOSION. — ACCIDENT FROM NITRO-GLYCERINE. — THE CENTRAL SHAFT. — THE TERRIBLE CALAMITY OF 1867.

QUITE recently I picked up a newspaper about thirty years old, and read in it an account of the great engineering difficulties which had been overcome in the construction of the Boston and Lowell Railway.

This road, twenty-five miles in length, was among the earliest constructed in America, there being less than half a dozen railway lines which are older. The account proceeded to say that the great obstacle was the deep cut through solid rock, near the city of Lowell; and I can remember, in my boyhood days, riding over this road, and as we reached the cut, the attention of passengers was called to it, and at least half our number projected their heads through the windows to look at the wonderful work. Three times was the work let out on contract, and twice did the contractors fail, one of them failing not only to complete the work, but to pay the men he employed. The third contractor succeeded, but I believe he made no money out of his speculation.

This once famous cut through solid rock is only a few hundred feet in length, and I think about forty feet in depth. It has dwarfed into almost microscopic insignificance by hundreds of other railway cuts in this country and in Europe.

Railway tunnels were at that day unknown, though tunnels existed in Europe for other purposes, some of them of very ancient date.

Tunnelling, in civil engineering, is an underground passage usually constructed for conducting a canal or road beneath elevated ground. In mining the term is also sometimes applied to horizontal excavations. Tunnels are more common in Europe upon railways and canals than in this country. In the United States the total length of tunnels is not more than one mile for every thousand miles of road. In Great Britain it is considered cheaper to tunnel through rocks than to make open cuts deeper than sixty feet. In England the Wood-head Tunnel exceeds three miles in length; and there is another on the London and North-western Railway nearly three miles long. Twelve or fifteen others on different roads exceed one mile each. The Box Tunnel on the Great Western Railway, between Bath and Chippenham, is thirty-one hundred and twenty-three yards long, or rather more than one and three fourth miles.

On the canals of England there are five tunnels exceeding three thousand yards in length. The longest of these is the Harsden Tunnel, fifty-five hundred yards long. In France there is one tunnel on the St. Quentin Canal over thirteen thousand yards long.

Some of the tunnels of the ancient Romans were quite extensive in their character. One which was constructed by the Emperor Claudius was cleared out some years since by the Italian government. It proved to be about three miles long, thirty feet high, and twenty-eight feet wide at the entrance, and was nowhere less than twenty feet high.

The excavation seems to have been conducted, after the plan practised at the present time, by means of a number of vertical shafts first sunk on the line of the tunnel, and from the bottom of these shafts the work was carried on simultaneously in opposite directions.

Another tunnel, made in the early period of the Roman republic for the partial drainage of the Alban Lake, is more than one mile long.

Most of the tunnels in America are on the lines crossing the Alleghany Mountains. There is one tunnel on the Penn-

sylvania Railway thirty-six hundred feet long. It was built in two years, and cost half a million dollars. There are many short tunnels on the line of the Baltimore and Ohio Railway, and there is a tunnel on the Blue Ridge Railway in Virginia forty-two hundred feet long. In South Carolina there are several tunnels, one of them nearly six thousand feet long. The Long Dock Tunnel in Bergen, New Jersey, opposite New York city, was completed in 1860. It is forty-three hundred feet long, twenty-three feet high, and thirty feet wide. On the line of the Central Pacific Railway, over the Sierra Nevada Mountains, there are several tunnels, the longest of them exceeding a mile; and railway engineering was carried to such perfection in the construction of this road that its tunnels were completed in a shorter time than in works of the same kind and with an equal hardness of rock anywhere else in the United States.

A journey through a railway tunnel is always more or less interesting to a novice, but an old traveller soon gets accustomed to it, and pays very little attention. On most roads, when a long tunnel is approached, it is customary in the daytime to light the lamps but this is by no means the general rule. Some queer incidents occur in these dark journeys through tunnels.

The darkness is so thick that one could almost cut it with a knife. It affords opportunities for enterprise, either for entertainment or mischief. Enterprising robbers sometimes conduct their operations in railway tunnels. Half a dozen of them will jostle a passenger, pick his pocket, and carry away his satchel, and when he emerges from the tunnel the robbers will have disappeared. It not unfrequently happens that loving couples bestow attentions upon each other in passing through tunnels which they would hardly indulge in were they in open daylight, and under the eyes of their fellow-passengers.

Every one has read, and many have seen, demure couples sitting quietly in their seats as the train enters a tunnel. There would be heard the sounds of a slight struggle, and

e of less slight kisses. When the train emerges into the ylight, the pair will be sitting as demure as ever, but with ddened cheeks and a general appearance of disorder.

On one occasion I was riding on a train approaching the rgen Tunnel, near New York. The lamps were not trimmed d burning, and when in the tunnel we were as much in the rk as an ignorant newsboy attempting to read a page of merit.

In front of me was a young couple, and by their devoted ntion to each other I concluded that they were not mar-d, or, if married, were wedded to somebody else than to nselves. The gentleman was reading a newspaper; the dy was busy with a novel, and giving an occasional glance s of the window. As soon as the train entered the tunnel was so dark that you could not see anything. I heard a uggle. There seemed to be a dislocation of hair, accom-nied by a shower of hair pins. The gentleman's hat fell to floor, and I heard his paper crush as though it had been ken up by a clothes-wringer. Then there were several warm culations, accompanied by ejaculations which sounded like, You ought to be ashamed. Somebody will hear you."

These utterances seemed to be more a matter of form than ything else, as the kissing went on like a company of infan-y engaged in file-firing. You would have imagined that a hole flock of school-girls had met another flock of school-ls, from whom they had been separated at least six months. By and by the train came out of the tunnel.

The gentleman recovered his hat and pretended to be read-g his newspaper; he had it upside down, and it was torn f through. The lady's book was open at about the first ge, though she had been reading it for three hours. Her r had been loosened, and was falling down. Her lace col-was disordered, and quite in keeping with the collar of her sculine friend, one side of which was turned up like the e of an old boot, while his neck-tie had lost its trim knot, its ends were dangling like a pair of fish lines over the e of a ship. The gentleman and lady were very red in the

face, and somewhat exhausted, and altogether they looked like a pair of butterflies that had been run through a sausage machine.

A story is told of a Frenchman travelling in a railway coach in England, who was very anxious to change his shirt in order to make a visit after the train had arrived, without taking the trouble to go to a hotel. His guide-book indicated a tunnel on the road, and he asked the guard or conductor how long the train would be in the tunnel. The guard mistook his question, and supposed he asked how long before the train would reach the tunnel. He answered briefly, "Half an hour."

The coach in which the Frenchman was travelling was filled with ladies and gentlemen. The traveller got down his valise, unlocked it, and made everything ready for a change of apparel while they were in the tunnel. As soon as they entered it he pulled off his shirt, and prepared to put on a clean one; but imagine his surprise, and that of his companions, on discovering that the train remained only three minutes in the tunnel, instead of thirty. As they came out in open daylight he was standing in their midst in a condition quite unfit for a mixed company of ladies and gentlemen.

The longest railway tunnel in the United States, is the Hoosac Tunnel, in Massachusetts. Its total length is twenty-four thousand five hundred feet, or more than four and one-half miles. Its width is eighteen feet, and its depth fourteen feet. As long ago as 1825, the Hoosac Tunnel route was surveyed, and a legislative commission was appointed to investigate the practicability of building a canal from Boston to the Hudson River. They made their report, in which they recommended a tunnel through the mountain.

In 1828 another commission reported to the legislature of Massachusetts that they could get over the mountain with a railway more quickly and more cheaply than through it, and recommended the Boston and Albany line, which was opened for travel in 1842.

From Boston to the Hudson River the route by way of the

ısac Mountain is very feasible, with the exception of the ıntain itself.

. story is told that Loammi Baldwin, the engineer who le the first survey for the canal, was very much in favor :his route. With a map or plan spread before him, he ıld say to the listener, "Why, sir, it seems as if the finger 'rovidence had marked out this route from the east to the t." "Perhaps so," said a listener, one day; "but what a · it is that the finger of Providence had not been thrust ›ugh the Hoosac Mountain!"

ı 1848 a company was chartered to construct a railway ween Troy and Greenfield. Three years later the work . begun, and the directors voted to expend twenty-five ısand dollars in making experiments upon the proposed nel. An enormous machine was constructed and set to ·k in the winter of 1852. It was expected to perform ıders, and it did; but they were all the wrong way. The :f wonder was, that the machine, so carefully constructed, such great cost, could do nothing whatever.

According to the description, it was "designed to cut a ove around the circumference of the tunnel thirteen inches le and twenty-four in diameter, by means of a set of revolv- cutters. When this groove had been cut the proper th, the machine was to be run back on its railway, and the ıtre core blasted out by gunpowder, and split off by means wedges." This wonderful engine was not all that fancy ıted it. It cut a very smooth and beautiful hole into the k for about ten feet. Then it became deranged, and the it never smiled again. Its cutting days were over, and ı it was withdrawn it was quickly discarded and sold for l iron.

Another boring machine of the same sort, which was to cut ıole only eight feet in diameter, was tried at the other end. nt, too, made a most glorious failure. Its failure was even re brilliant than that of the first machine, for it never succeeded in cutting a single inch of rock.

Different engineers have tried their hands and their skill

on the Hoosac Tunnel. In 1854, the legislature of Massachusetts appropriated two millions of dollars to the Troy and Greenfield Railway, and in the following year they were at work in earnest.

General Haupt, who became famous in the late war as a bridge-builder, attempted to pierce the Hoosac Mountain; but after several years he abandoned the work, and the whole property of the company was transferred to the State of Massachusetts. When the state took possession it began work on its own account, and in 1868 the legislature appropriated five millions of dollars, and made a contract with Walter and Francis Shanly, of Canada, for the completion of the tunnel. They began work in the following March, and there is very little doubt of their completing the tunnel.

In 1870 I made an excursion up the valley of the Connecticut as far as Greenfield, and there took the railway train to the Hoosac Mountain. At the east side or end of the tunnel I abandoned the cars, and took to a six-horse coach. I managed to obtain a seat near the driver, a burly, moon-faced fellow, who collected fifty cents extra for the privilege of riding near him. He treated everybody on the outside as politely as though he were king of the Cannibal Islands, and we were his subjects. For downright impudence, with a good deal of rudeness to the bushel, I will back an American stage-driver against any other man in the world.

Soon after dinner we drove away from the station, and after the horses had given us a little circus exhibition on their own account, which threatened to overturn us and break half a dozen necks, we climbed slowly up the valley skirting the edge of a forest, whose leaves were tinged with the varying colors of autumn. Our progress up the eastern face of the mountain was slow, but when we came down the western side the case was different. On the upper part of the mountain there is a long and comparatively level stretch of ground, on which there are many fine farms, and a general appearance of prosperity. Approaching the western face of the mountain, we overlooked the flourishing town of

rth Adams, and a region of country spread out before us
a beautiful panorama. I have looked from mountains in
ny countries, but rarely have I gazed upon a landscape
re beautiful and more attractive than this. It is not grand —
fully grand — in its character, like many other landscapes,
there is an air of beauty about it which makes it charm-
in the extreme.

The road winds, in a sort of zigzag, down the side of the
ntain, and our horses went at a good speed. The coach
ng from side to side, and the baby of a feminine passen-
screamed as if a dozen pins were being driven an inch or
into its arms and legs. Down, down, down the mountain
went, and soon we were inside the busy town, and were
ven up in front of the Wilson House. There I concluded
remain, and take my point of departure the next day for
tunnel.

On the following morning it was raining, not exactly cats
l dogs, but a drizzly, misty, damp — very damp — sort of
. I did not care very much for rain, though, especially as it
le no difference, when once in the tunnel, what the outside
ather might be. When breakfast was over, I started for
tunnel under the escort of the proprietor of the hotel.

The western portal of the tunnel is two miles south of the
lage. The road leading to it is among some small hills that
pear trying to hug the mountain. Mr. Haupt began his
rk on this side of the mountain, in a limestone rock, from
ich he expected to pass directly into the solid primary rock,
ming the base of the mountain; but to his surprise and mor-
cation, his hopes were not realized.

Instead of reaching the solid rock, he entered into a mass
t is known as demoralized rock, a sort of combination of
ea, quicksand, water, and everything else that is disagree-
e. It was perfectly unmanageable. As fast as they dug
ut it flowed in. Imagine a mouse attempting to construct a
nel through a barrel of swill, and you can form a very
ol idea of the difficulty of working in this rock. You

might as well attempt to make a tunnel through a thousand cart-loads of soft mud; in fact, you could get along easier in the mud than in this demoralized rock, because you could take precautions against the flowing in of the mud, which you could not take against this disintegrated mica. It is a sort of soft stuff which French miners denominate "moutarde," and English miners allude to as "porridge."

In order to escape this porridge, the engineer tried to make a tunnel farther up the hill-side; but it was of no use. There was the stuff again, and somehow it must be met. Not only was it impossible to prevent its caving in, but it was necessary to prevent its rising upward. Consequently an arch must be made below, as well as above; in fact, it was necessary to construct the brick-work in such a way that it would form, when completed, a perfect cylinder, as the pressure of the porridge would be exerted in all directions. As the work was put forward and completed, a casing of timber was made, and inside this casing of timber the brick arch of the tunnel was built.

Our first visit was made to the western portal, into which we penetrated several hundred feet. For about seven hundred feet, the tunnel is laid in brick seven or eight courses thick, and forms a complete arch. Beyond that the rock is quite soft, but sufficiently hard to sustain itself long enough to permit the construction of an arch. When this work is completed there will be some two thousand feet of brick arching.

We thought that in entering this western part of the tunnel, we should get out of the rain; but we found streams of water occasionally coming through the brick-work, and especially through the stone at the heading, where the work of arching was going on. Quite a stream of water ran through the bottom of the tunnel, and I managed, in the course of my walk, to get my feet pretty thoroughly soaked. However, I had been wisely encased in a suit of old clothes, and when I emerged, there was more mud than clothing visible about me.

Climbing out of the western portal, we took the open road

EASTERN ENTRANCE.

WESTERN ENTRANCE.

THE HOOSAC TUNNEL, MASSACHUSETTS.—LENGTH 21,500 FEET. COST ABOUT **$15,000,000.** FIRST TRAIN OF CARS PASSED THROUGH *APRIL 5, 1875.*

and went to what is known as the western shaft. The
hrough the demoralized rock and porridge was so slow
e engineers determined to sink a shaft farther up the
ain. It is about half a mile from the portal, and is
undred and eighteen feet deep.
soon as the shaft was sunk, the miners turned and
l outwards through the soft rock, cutting a small
e through to the western portal, so as to allow the
to drain off, and thus save the use of the pumps. In
her direction, that is, towards the east, the miners had
the solid rock of the mountain. At the time of my visit
ere about half a mile from the bottom of the shaft.
g our road forming the portal to the shaft, there was a
stream of water. My guide explained to me that in
eat flood a year before, the water came down, tearing
he embankment which separated the brook from the

In a few minutes the embankment was all torn away,
e whole force of the stream was poured into the

An alarm was given as quickly as possible, and by
g rapidly, the men who were working in the tunnel
d, with the exception of one who was doing his first
ork there, and was probably delayed by his unfamil-
with the place. In a very short time the water
tely filled the tunnel, and it was some weeks before
rks were restored to their old condition.
g this brook and around the west shaft there was quite
ge occupied by the miners and their families. The town
th Adams provided a school-house and a school for the
n, of whom nearly one hundred received instruction there
the week. For a part of the year the school-house was
d at different hours, on Sunday, by two Sunday schools,
nducted by some of the Protestant churches, while the
s under the care of the Roman Catholics.
nd the shaft were the usual buildings and shops for the
of tools, and for the ordinary machinery used about
e. After a pleasant talk in the office of the superin-

tendent, I was requested to dress in an oil-skin suit and a lantern, preparatory to going below. When all was ready, we went to the shaft, entered a cage, and descended. From the bottom of the shaft we struck out along the tunnel to make our way to the heading.

Our guide explained to us that there would be a blast in about twenty minutes, and that we must move forward at good speed in order to see it. "Step right out without fear," said he; "there is no danger of falling through, as the bottom is perfectly solid. You need not mind splashing those boots with water and mud, as they are used to it."

I obeyed his directions and followed him, and I did some very rapid walking. The lanterns gave out just about light enough to make darkness visible. Away in the distance we could see the lights of the miners, and hear the noise made by the machinery and the tools of the workmen. An iron pipe six inches in diameter lay at one side of the floor, and through this was forced the air which furnished the power to the drilling machinery, and at the same time ventilated the tunnel. A channel had been cut in the solid floor to carry off the water which flowed in from various seams in the rock.

A short distance from the foot of the shaft were the stables, containing several mules, which were used for hauling the cars. The mules seemed to look at us with a desponding gaze, as if connecting us in some way with the outside world, which they would never see again.

"Did these animals," said I, "come down in the cage where we descended?"

"Certainly," said the assistant superintendent. "How else could they come down? They were sent down in that box, not all together, but only one at a time."

I endeavored to ascertain how it was possible to pack a live animal into that cage without killing him. The assistant said it was easy enough if you only knew how, and could induce the animal to do as you wanted him to. "They are good mules," said he, "and with a strong rope you can

them up any way, though they do not exactly like it. y live two years longer, they will get out alive, other- they will die here. It does not pay to be hoisting live out, and lowering other live mules in. When they get hey stay till we are through with them."

ut half way from the shaft to the heading we passed a of surveyors, who were making an alignment of the to see that everything was correct. They had the y instruments used for levelling purposes in the open t it seemed rather odd to find them using the same ments by the light of lanterns, and laying out the track far n the interior of the mountain. Every foot of the work tunnel had to be laid out with the utmost care, in order e ends, when they met, could be made to join perfectly. re was a narrow track along the bottom of the tunnel, cars drawn by mules, for the removal of the rock to the f the shaft, where it could be hoisted out. My guide told hat a recent visitor to the tunnel asked, with apparent nce, why they hoisted out all that rock, and suggested it would be much easier to dig a hole in the bottom of the el, and bury it there; but he did not suggest what should one with the rock which they removed to make the hole. encountered several of these cars, and at one place were ded rather closely against the walls.

riginally gunpowder was used for blasting purposes in the al, but later in the work nitro-glycerine was adopted.

veral accidents with explosive materials occurred during construction of the tunnel, one of the most serious being in . The magazine where the nitro-glycerine was stored for ations on the eastern part of the tunnel, was about a quarter mile from the portal. Three of the miners went one ning to prepare the nitro-glycerine for the day's use, and an sion occurred, killing them all. Two of them were inside building at the time, and nothing but a few pieces of them found; the other, who was outside the building, was so disfigured that it was almost impossible to identify him, he force of the explosion was so great that not a plank or ber of the building remained.

On the 19th of October, 1867, a terrible accident occurred at this shaft. A depth of nearly six hundred feet had been reached, and thirteen men were at work below. The gasoline apparatus used for lighting the works exploded, and set fire to the buildings. The engineer was badly burned, and driven from his post, and the men perished by suffocation. The shaft was soon filled with water, but it was not until next day that the fire was extinguished so that anybody could descend. A workman named Mallory was lowered, with three lanterns attached to him. Near the bottom two of his lanterns went out, and at a signal he was drawn up nearly insensible from breathing the foul air. He said there were fifteen feet of water in the shaft, and no signs of the men. It was necessary to erect buildings and machinery to clear the shaft, and it was not until a year after that the water was pumped out, and the bodies of the victims were recovered. They were all in a good state of preservation, but crumbled to pieces soon after exposure to the air.

As we neared the heading the noise increased. The shouts of the miners and the sound of the drilling machines overpowered any ordinary tones of the voice. The drilling machine was an iron frame, resting upon trucks, and was pushed as near as possible to the face of the rock. The drills were fastened to it in such a way that they could be turned upon any designated point. They were operated by compressed air, and worked with great rapidity, striking as many as three hundred blows to the minute. The quality of the rock was generally so hard that the drills became dull and blunt in a short time, and required to be sharpened; but they worked much more expeditiously than hand drills. Under the ordinary process of hand drilling it would take six weeks to accomplish the distance made in a single week by them.

When the drill-holes had been sunk to the required depth, the machine was moved back, and some plank doors were closed in front of it to prevent injury by the flying fragments of rock. Just as we reached the end of the heading the noise ceased, and the machine was drawn back, preparatory to blasting. The holes were cleared, and then three men came forward with the

WORK AT THE READING IN HOOSAC TUNNEL.

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ASTOR, LENOX
TILDEN FOUNDATIONS

of nitro-glycerine in long tin tubes. These were put in
s. the wires were fastened in their places, and then the
ved back; it is hardly necessary to say that I moved
the same time, and quite as far as the workmen.
ing being ready, the signal was given.
: out that you are not blown down!" said my guide.
look out. There came a sound and a quick explosion,
by the rumbling and crashing of the rock, and then a
ir and smoke that almost threw me over.
ressure of the air in the iron pipe for working the drills
ilating the tunnel was about six atmospheres, or ninety
o the square inch. As soon as the blast was made, the
turned on; the smoke from the blast was driven back,
miners found themselves in a clear atmosphere.
this blast it was intimated that there was nothing more
nd we made our way out of the tunnel into the open
. and back to the Wilson House.
ember 12th, 1872, the east heading was connected with
lriven east from the central shaft. The west heading
nected with the one driven west from the shaft on the
November, 1873. This proved a splendid engineering

ad bed was finished and the track laid early in 1875,
first freight train passed through on the 5th of April of
. The first passenger train was run through July 8th.

to the explosive action of nitro-glycerine the rock was
for some distance beyond the limits planned in con-
the sides and arch of the tunnel, and there was con-
nger of pieces of rock falling upon the track. The
arching it with brick was conceived of, and a contract
le in 1874, to do the arching and also to enlarge a
f the tunnel at the eastern terminus. This work was
d, and the road is now in complete running order.
st of the work in the aggregate is nearly $15,000,000.
struction of the tunnel opens direct communication
Boston and Troy, and is of inestimable advantage to
usetts from a commercial point of view.

XXXIV.

THE MONT CENIS TUNNEL.

MOUNTAIN CHAINS BETWEEN NATIONS. — MONT CENIS. — CROSSING THE ALPS. — THE GREAT ALPINE TUNNEL. — LAYING OUT THE WORK. — THE ARC AND DORA. — DIFFICULTIES. — THE SURVEYS. — PENETRATING THE MOUNTAIN. — COMPLETION OF THE WORK. — THE CHANNEL TUNNEL. — ITS COST. — COST OF TUNNELS IN VARIOUS COUNTRIES.

It has been said with truth that "mountains interposed make enemies of nations." In various parts of the world we find that mountain chains stand as barriers between different nations, and in many instances the boundaries thus formed by nature have remained unchanged for hundreds of years. On the map of Europe the most prominent mountain chain is that of the Alps, and it has stood as a separating line between nations for a long time. It is true that occasionally wars have been carried beyond these mountain chains, and conquests have been made in spite of them; but for practical purposes the chain of the Alps has been for centuries the separating line between France and Austria on the north, and Italy on the south. Sometimes the French possessions have extended to the south of the Alps, and sometimes Italy has extended her possessions to the north of that chain. Such possessions have never been held for a great length of time, and in one way or another they have fallen to the nation to whom they belonged by natural position.

Carriage roads were long since made across the Alps. In later years the railway has traversed these mountains, but the ascent is tedious and laborious, so that rapid communication was impossible. It remained for the science of the present day to overcome the obstacles which the mountains afforded, not by cutting away the Alps, but by piercing a passage through them.

More than twenty years ago the attention of the French
d Italian governments was called to the necessity of a tun-
l through the Alps by which France and Italy should be
nected. The project was discussed for some time, and
ally a convention was formed between France and Italy
the purpose of undertaking the work. Four or five years
re consumed in surveys and in the contemplation of plans.
sorts of objections were made, and a list of these objec-
s forms a humorous page. One man contended that the
t would be so great in the centre of the mountain that the
n would be roasted alive while working in the tunnel.
other was positive that the noxious gases and vapors
ing in the tunnel would suffocate everybody. Another
tended that rivers of water would be found in the moun-
n so great that they would overwhelm the workmen, and
vert the tunnel into an enormous spring. And so on, one
er another, the objections were heaped up, and there was
one time a prospect that the work would not be undertaken.
The actual work on the tunnel was begun on the Italian
de in 1857, and a little afterwards work on the French side
lso commenced. A great deal of labor had been performed
locating the tunnel. A mountain chain is not a single line
f mountains, like a row of potato hills; but it consists of a
entral back-bone of mountains, with other and smaller moun-
ins on either side, so that a chain may often be a hundred or
ore miles in width. Now, in piercing a chain like the Alps,
is necessary to find a way among the outlying hills on each
de through the valleys of the rivers that flow from the
entral chain. In this way the open-air railway is brought to
he foot of one of the mountains forming the great central
ack-bone.

But a difficulty arises in finding two of these valleys direct-
y opposite each other. You may follow a valley until you
et to the very base of one of the highest mountains of the
nge, but on looking to the other side you may find no cor-
esponding valley.

It was this peculiarity of all mountain chains that greatly

hindered the location of the Mont Cenis Tunnel. After much search, the best location was found to be by following the valley of the River Arc, on the northern side, and the River Dora, on the southern. A great many surveys were made, and it was finally discovered that the Arc and Dora, in their windings, were, at a certain point, less than eight miles apart. At this point, it was evident, Nature designed — if she had any design about it — that the great work should be constructed.

In 1867, while travelling north from Italy to France, I determined to pay a visit to the Mont Cenis Tunnel. It was said to be quite difficult to obtain a permit to enter the workings; but perseverance and letters of introduction will accomplish a great deal, and after a little delay I obtained what I asked for. I found it more convenient to visit the northern end of the tunnel for the reason that on the Italian side the workings were sixteen miles away from the regular line of travel, while those on the northern side were directly on the route of tourists.

A railway over Mont Cenis was then under construction, and nearly completed; but as it was not open for travelling, I made the transit in a carriage, just as many thousands of people had made it before me. The railway over the Alps is of itself a curiosity. In some places the ascent equals one foot in ten, so that great power was required for the locomotives to enable them to drag their burdens upward. The track was narrow, and it was peculiar in having three rails instead of two. The wheels of the carriages run on two rails only, just like wheels of carriages on other railways. The central rail was intended for the use of the locomotives, to assist their power of traction. The wheels were arranged on these locomotives in such a way as to grip the central rail with tremendous force, and the brakes were also so arranged that by pressing this central rail they could bring the carriages to a sudden stop in case of accident.

The line of the railway over Mont Cenis follows very nearly the carriage road, and occasionally crosses it. In some places

it passes through short tunnels, and in others it is roofed in to avoid injury by snow. In crossing the mountain by this railway very little time is saved over the ordinary carriage route, while the latter is very much to be preferred on account of its comfort and the advantage it gives for observing the scenery. We were a party of four, and after an unhappy night in a dirty hotel at Susa, an old town founded by the Romans, and containing some ruins dating from the time of the Romans, we started on our journey.

Our night had been unhappy. Our breakfast was still more unhappy, and our bill for what the landlord facetiously termed our "entertainment" was the worst feature of all. The discomfiture of his establishment was greater than the comfort of the best hotel in Paris, and he charged us about twice the rate that any Parisian landlord would dare to ask. We consoled ourselves and settled our breakfast by getting up a magnificent row with him, threatening to break his head, and talked at least fifteen minutes in mingled *patois* of English, French, Italian, Russian, and Chinese. We did not succeed in having our bill reduced, but I am confident if what we said to that landlord remained ringing in his ears for twenty-four hours, it must have driven him to hopeless insanity.

We wound slowly up the mountain, with the top of our carriage thrown back, so that we could enjoy the view.

The Mont Cenis Pass is the least interesting of all the great passes of the Alps. Tourists complain of its tameness, but there are points where it is picturesque.

At places during the ascent we had some fine views of that portion of Italy which stretches away from the base of the mountain, and we tried to imagine that we could now and then catch a glimpse of the Mediterranean Sea. The rough mountains were piled above and around us, frequently in fantastic shapes, and we found the air getting steadily more and more cool as we made the ascent.

Finally on the summit, only a few hours after leaving a tropical temperature in Italy, we were riding amid fields of snow, and shivering in our travelling coats and thick shawls.

The ascent was slow, but the descent on the French side was rapid. As we passed the boundary between France and Italy, our driver gathered his reins, and the horses went at full speed down the magnificent road. We left a cloud of dust filling the air behind us, and were whirled along so rapidly that I sometimes thought we might be tossed over one of the precipices in some of the short windings of the road. At every half mile there is a small shed, or house, known as the "refuge." It is intended for travellers who are overtaken on the mountain, during the winter season, by violent snow-storms.

As it was summer we had no occasion to seek these refuges, but it was easy to see that they were of great advantage in protecting and saving life during the severer portion of the year.

At Lans-le-bourg we stopped at the French custom-house to undergo an examination; but our baggage was so small in quantity, and we manifested such a readiness to submit it to inspection, that the officers of customs did not detain us. Behind us was a carriage, in which were two American ladies, and they drove up a few moments before we started. They had that enormous amount of baggage peculiar to their sex and race, and protested that their trunks contained nothing of value. But the custom officers were inexorable, and as we drove away, the trunks of the ladies were being unpacked, and were undergoing a rigid examination. If you wish to avoid trouble at custom-houses when travelling in Europe, never carry a large amount of baggage, and never show the least hesitation to open it for inspection. Many a time have I found my baggage passed without examination, while the next man's would be overhauled, and, as nearly as I could judge, only for the reason that he urged the officers not to look at it, and assured them that it contained nothing contraband.

At Modane we found the base of operations for the northern part of the tunnel, and here we halted to make our investigations. By the way, I never have been able to make out why the name of Mont Cenis should be attached to the famous tun-

el, since that mountain is about twenty miles away from it. he tunnel does not pass under Mont Cenis, but under three eaks called Col Frejus, Le Grand Vallon, and Col de la one, the first being on the French, the third being on the alian slope, and the second about half way between the two. suppose, however, that the tunnel was named after Mont enis because it is better known than any other summit or nge in this neighborhood, and because it would be better to ive it a name which does not belong to it at all, rather than aming it after any one of the three peaks deserving equal istinction.

Modane, or, more properly speaking, Fourneaux, was the ase of operations. Fourneaux is a miserable little village in narrow gorge in the valley of the Arc, and its inhabitants are hiefly remarkable for their deformity and idiocy. The Grand allon is eleven thousand feet above the sea level, and rowned with snow. Its sides are steep, and it would be quite mpossible to carry a railway over it. The other mountains on the route are equally rugged in character, but their height bove makes little difference with the workings carried on in heir interior.

The Mont Cenis Tunnel is the largest in the world, extending from Fourneaux, on the French side, to Bardonnecche, on he Italian side. When it was begun, with the ordinary system of hand drills, it was found that at the ordinary rate of progress, it would take thirty or forty years to finish the work. With an ordinary tunnel, where the elevation of earth or ock is not very great, shafts are sunk along the line, as efore stated: but in this case it was impossible to sink these ertical shafts, on account of the great distance. A necessity arose for penetrating the rock much faster than by ordinary eans, and there was also a necessity for supplying the workmen with fresh air.

These necessities led to Sommelier's invention of drills orked by compressed air, and of the machinery for compressing the air. The machines have already been described in onnection with the Hoosac Tunnel. A great many experi-

ments were made before the air could be successfully used; but finally, when they were completed, the work progressed rapidly. By means of the compressers that were worked by a stream of water from the mountain, the air was reduced to one sixth of its natural bulk, and thus, when liberated, it exercised an expansive force equal to six atmospheres. The compressing machines used at most tunnels to-day are simply enormous and very powerful pumps, but the machine of Sommelier used the weight of water. Twenty or more large iron tubes were placed in an upright position. The "head" of the supply was far up the mountain side, and the water was brought to the machine in an iron pipe. A piston perfectly tight was fitted to the tube, the water was turned on, and its weight, added to the head it had received, compressed the air in the tube. As it was compressed, a valve was opened, through which it could escape into a reservoir. From this reservoir the air was conveyed in an iron pipe into the tunnel, where it was used to work the perforators.

We found that the entrance to the tunnel was quite a distance up the side of the mountain, and it was evident that considerable engineering skill would be required to bring the railway track thither when the work was completed. Opposite the mouth of the tunnel, my attention was called to a large target, made of boards painted white, and securely fastened against the rock. The target was used for the proper alignment of the work. At every foot of progress into the mountain, bearings were carefully taken. At night a Drummond light was placed in the centre of the target, so that it could be visible from the middle of the mountain.

It will be seen that it was a work requiring the utmost caution to lay out the route and direction of the tunnel through the mountain. A variation of a hundredth part of an inch at any point in the surveys would have changed the course of the working on one side or the other, so that the two ends would not meet. Bear in mind that these surveys were carried from the valley of the Arc to the valley of the Dora,—the opposite points being eight miles apart,—and the route

ing, not through level fields and meadows, but over three ough and high mountains, where there was no path beyond that which the surveyors and their assistants laid out. And et, so carefully was the work performed from the two sides, hat the workings were brought together exactly, without a ariation of a single foot.

The entrance to the tunnel is about twenty-five feet wide, nd the same in height. To go inside the workings, you are ed with a rubber suit, and supplied with a lamp, and ac-ompanied by a guide. For some time after the working be-an, almost any one could be admitted; but it was found that he workmen were greatly hindered by frequent visits, so that he rules became very strict. No one could enter the tunnel, nless employed there, without a pass from the management, hough it was not very difficult for a journalist or a person of nfluence or prominence to obtain admission. As fast as the work progressed, a double railway was laid down to carry in the materials used in the working, and to bring out the bro-en rock. There was a narrow sidewalk of flagged stone on each side. The pipes for the air were ranged along the side of the tunnel, and between the lines of the rails, in a deep trench, were the gas and water pipes.

Like all tunnels this one was damp, from the streams of water coming through the roof; and if you wondered before entering, why you should be asked to wear a rubber coat, your wonder speedily ceased. At the time of my visit the workmen were nearly three miles from the entrance, — that is to say, the tunnel was finished for that distance, — while for about a quarter of a mile the men had cut the heading, but the upper part of the tunnel had not been opened.

The heading is the most difficult part of the work, and in all tunnel operations the workmen at the heading are kept sufficiently in advance of the enlargers, so that one party will not be in the other's way.

The passage from the entrance through the finished portion was comparatively easy, but after you reached the newly-opened part you found it more difficult. There were wagons

and men moving to and fro, and fragments of rock were lying everywhere about. The space was narrow, and every little while you found yourself running much nearer a man or a mule than you wished to; unless you moved about very carefully, you were under the risk of being run over by a mule, or crushed by the wheels of a wagon.

The perforators kept up a perpetual din, and you could hardly hear yourself speak; and I have heard persons aver that you could not hear yourself think. The drill of the Mont Cenis machine stands on a carriage, which the Italians call the "Affusto," and it strikes about two hundred blows a minute. Its force upon the rock is about two hundred pounds.

A stream of water is thrown upon the rock into the drill-hole, to facilitate the perforating process.

The wear and tear of machinery in the tunnel were very great, owing to the hardness of the rock. Every fifteen minutes it was necessary to change the drills, and a great many *affusti* were worn out.

It was estimated that by the time the tunnel was completed four thousand machines were utterly worn out. At the entrance of the tunnel we saw a great many of these disabled *affusti*, reminding us of worn-out carriages around a stable.

With the exception that the workmen were clad in different costumes, and were shouting in French instead of English, the work was very much like that already described in the Hoosac Tunnel. Accidents were much more frequent in the Mont Cenis Tunnel than in the Hoosac Tunnel, for the reason that much less care was taken. It was said that nearly twelve hundred men lost their lives in the tunnel, or in connection with it, during the time of its construction, — at least, some of the workmen said so, — while the guides and directors insisted that the loss of life had not been more than one tenth of the number. Owing to the hardness of the rock the cost of the work was very great. Taking the average of the whole length of the tunnel, it was one thousand dollars a lineal yard, making a total, in round numbers, of fifteen millions of dollars.

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The expense was shared between the French and Italian governments, and the tunnel will form a bond of union between the two nations greater than could be made by any other use of the same amount of money. By the terms of the convention between the governments, the tunnel is to remain uninjured should France and Italy be engaged in hostilities against each other. The tunnel shortens the route of travel very materially, and where the route of travel is shortened the work of peace and good will among men is greatly facilitated.

A tunnel has been proposed for the Straits of Dover, between England and France, and several plans have been considered. The London Times stated, early in 1872, that a company has been formed and funds subscribed to the amount of some one hundred and fifty thousand pounds, with the immediate object of making a trial shaft, and driving a driftway on the English side about half a mile beyond low-water mark, with the view of proving the practicability of tunnelling under the Channel. The completion of this work will furnish data for calculating the cost of continuing the driftway from each shore to a junction in mid-channel, and capital will then be subscribed for that purpose, or for enlarging it to the size of an ordinary railway tunnel, as the engineers may deem most expedient.

The tunnel will be made through the lower or gray chalk chiefly, if not entirely, and by the adoption of machinery, of which the promoters of this company have recently made practical trials, it is expected the passage from shore to shore can be opened within three years from the time of commencing the work, and at a cost very considerably less than any previous estimates.

The same paper, referring to the proposed enterprise, gives the following details about railway and other tunnels: "The cost of existing tunnels has been governed by such various conditions of locality and soil, that they can have little bearing upon the present question. It may be worth while, nevertheless, to cite a few prominent examples. The Mont Cenis

Tunnel has cost one hundred and ninety-five pounds per linear yard, which would amount, for a length of twenty-two miles, to seven millions four hundred and fifty thousand four hundred pounds. The three most costly tunnels made in England have been the Kilsby, the Saltwood, and the Bletchingley, each of which was executed in treacherous strata, giving out large quantities of water. In making the Kilsby Tunnel a hidden quicksand was discovered, by which the works were drowned out. For a considerable time all pumping apparatus appeared insufficient, but by the employment of one thousand two hundred and fifty men, two hundred horses, and thirteen steam engines, working night and day for eight months, one thousand eight hundred gallons per minute were raised from the quicksand alone. The cost of the work was raised from ninety thousand pounds, the original estimate, to three hundred and fifty thousand pounds, or one hundred and forty-five pounds per yard for two thousand four hundred yards. The same rate of expense for twenty-two miles would amount to five millions six hundred and forty-six thousand six hundred and twenty pounds. The Saltwood Tunnel cost one hundred and eighteen pounds per yard, the Bletchingley seventy-two pounds; or for twenty-two miles, four millions five hundred and sixty-eight thousand nine hundred and sixty pounds, and two millions seven hundred and eighty-seven thousand eight hundred and forty pounds, respectively.

"The cost of railway tunnels in France has varied from thirty pounds per yard — being that of Terre Noire, on the Paris, Lyons, and Mediterranean Railway, to ninety-five pounds per yard, that of Batignolles, near Paris, on the Chemin de Fer de l'Ouest. In Belgium, Braine le Comte Tunnel cost forty-six pounds per metre, and the tunnels on the Liege and Verviers line fifty pounds per metre. In Switzerland the very difficult Hauenstein Tunnel between Basle and Berne cost eighty pounds a yard.

"In America, the Hoosac Tunnel, in Massachusetts, through mica slate, mixed with quartz, has up to this time cost one

unnel Tunnel must at present be purely conjectural,
estimate professing to embrace contingencies must be
onjectural than any other; but it is reckoned that the
f practicable at all, could be completed within five
f time, and for five millions of money."

XXXV.

THE PARISIAN SEWERS.

THE SEWERS OF PARIS. — THEIR EXTENT. — A JOURNEY THROUGH THEM. — THE START AND THE MODE OF TRAVEL. — DESCRIPTION OF THE GREAT SEWER. — ACCIDENTS OF SEWER TRAVEL. — HISTORY OF THE SEWERS. — THEIR FIRST GREAT INSPECTION. — BRUNESEAU. — INUNDATION FROM THE SEWERS. — A MAN LOST. — HORRIBLE DEATH IN THE SEWERS. — THE OLD AND THE NEW. — THE EXCAVATIONS. — NATURE OF THE WORK. — BREAKAGE OF THE CANAL. — JEAN VALJEAN IN THE SEWERS OF PARIS. — HIS FIRST SENSATION. — CAUGHT IN A LABYRINTH. — THE SEWERS OF ST. DENIS, AND THE MARKETS. — CAUGHT IN THE WATER. — THE POLICE IN PURSUIT. — FRIGHT OF THE FUGITIVE. — THE QUICKSAND ON THE COAST OF BRITTANY. — A HORRIBLE DEATH. — QUICKSAND IN THE SEWERS. — HOW IT WAS FORMED. — JEAN VALJEAN IN THE QUICKSAND. — HIS SUFFERINGS AND ESCAPE.

PARIS, the gayest and brightest city in the world, has an underground life surpassing that of any other metropolis. Beneath the broad streets there are many miles of sewers constructed on a plan that furnishes a complete system of drainage. The total length of the Paris sewers is now about four hundred and thirty-four thousand yards, or three hundred miles. The length of galleries to be constructed in course of time is about two thousand yards more. To organize the network of sewers, the site of the capital has been divided into five basins, of which three are on the right and two on the left bank of the Seine.

Six great principal galleries, cutting the city nearly at right angles, and having for tributaries fifteen secondary galleries, out of which branch a multitude of galleries of less importance, constitute the principal arteries of the network. Three of the six principal galleries are on the right bank of the river: the first is that of the quays; the second descends the Boulevard de Sebastopol, and joins the first at the Place du Chatelet;

e third runs from the Place de la Bastille to the Place
oncorde, through the streets St. Antoine and de Rivoli.
he left bank the first gallery includes the line of the
from the Pont d'Austerlitz to the Pont d'Iena; the
follows the Boulevard St. Michel from the Place de
vatoire to the Pont St. Michel; and the third receives
evre, and at the Rue St. Jacques joins the long gallery
nich the sewer of the Boulevard St. Michel falls.

sewers, or at any rate a portion of them, are interest-
ces to visit, though nobody would care to live in them.
limited number of permissions are granted, and these
n stated days. I experienced considerable difficulty
ring a ticket, and it was only after exercising patience
rseverance to a liberal degree that my wishes were
d.

ordinary route for visitors is to enter at the Place de
corde, or near the Madelaine Church, and come out at
ce du Chatelet. The sewer between these points is
road and high, and is evidently the show-place of the
system. In the centre is a canal about eight feet wide,
its edges there are rails for the wheels of cars pro-
by the workmen, who walk at the sides. The side-
are broad and carefully swept, so that one could
pon them without difficulty. Visitors are generally
in the cars and pushed along by the men to whom they
pected to give some money at the end of the jour-
The car moves above the canal, and every visitor is
ed at the absence of foul odors and at the general
ess of the place. On each side of the larger sewers,
pported on iron posts, there are large pipes for the con-
e of water, and in some places the telegraph wires and
es are visible.

n everything is in order, there is very little to see, and
red yards or so are as good as the entire distance.
nt rumbling of the carriages can be heard overhead,
erwise the silence is unbroken, save by the voices of
itors and workmen, and the occasional sound of falling

water. The party to which I was assigned was a serious one, and made very little noise, compared to one a little way in advance, and containing several ladies. The presence of lovely woman can add a charm to a sewer, though I should hesitate to take a feminine acquaintance into such a place until I had first made the journey. We had no incident of importance greater than the loss of a hat, which was crushed beneath the car wheels, and the narrow escape of the owner from a tumble overboard as he attempted to clutch the falling article. The place was well lighted with gas; but I think everybody was glad to see the light of day as it streamed through the opening at the Place du Chatelet.

The sewers of Paris were begun several hundred years ago. The exact date is not known; in fact, their history is not exactly known, and some of it is mixed up with a great deal of fiction. In *Les Misérables*, Victor Hugo has given a graphic account of them, though, like much that he has written, the account is not always strictly true. (I quote his language.) He says, "The sewer of Paris, in the middle ages, was legendary. In the sixteenth century, Henry II. attempted an examination, which failed. Less than a hundred years ago, the cloaca, Mercier bears witness, was abandoned to itself, and became what it might.

"Such was that ancient Paris, given up to quarrels, to indecisions, and to gropings. It was for a long time stupid enough. Afterwards, '89 showed how cities come to their wits. But, in the good old times, the capital had little head; she could not manage her affairs either morally or materially, nor better sweep away her filth than her abuses. Everything was an obstacle, everything raised a question. The sewer, for instance, was refractory to all itineracy. Men could no more succeed in guiding themselves through its channels than in understanding themselves in the city; above, the unintelligible, below, the inextricable; beneath the confusion of tongues there was the confusion of caves; labyrinth-lined Babel.

"Sometimes the sewer of Paris took it into its head to overflow, as if that unappreciated Nile were suddenly seized with

. There were, infamous to relate, inundations from the
:. The inundation of 1802 is a present reminiscence with
arisians. The mire spread out in a cross in the Place
ictoires, where the statue of Louis XIV. is; it entered
ue St. Honoré by the two mouths of the sewer of the
ps Elysées, the Rue St. Florentin by the St. Florentin
, the Rue Pierre à Poisson by the sewer of the Sonnerie,
ue Popincourt by the sewer of the Chemin Vert, the
le la Roquette by the sewer of the Rue de Sappe; it
ed the curbstones of the Rue des Champs Elysées to the
of some fourteen inches; and on the south, by the vomi-
of the Seine performing its function in the inverse way,
etrated the Rue Mazarine, the Rue de l'Echaudé, and
ue des Marais, where it stopped, having reached the
h of a hundred and twenty yards, just a few steps from
ouse which Racine had lived in, respecting, in the seven-
century, the poet more than the king. It attained its
num depth in the Rue St. Pierre, where it rose three
bove the flagging of the water-spouts, and its maximum
t in the Rue St. Sabin, where it spread out over a length
hundred and sixty-one yards.

t the commencement of this century the sewer of Paris
till a mysterious place. Mire can never be in good
e; but here ill-fame reached even fright. Paris dimly
ed that she had a terrible cave beneath her. People
l of it as of that monstrous bog of Thebes which swarmed
scolopendras fifteen feet long, and which might have
l as a bathing-tub for Behemoth. The big boots of the
men never ventured beyond certain known points.
were still very near the time when the scavengers' tum-
from the top of which Ste. Foix fraternized with the
is of Créqui, were simply emptied into the sewer. As
eansing, that operation was confided to the showers,
obstructed more than they swept out. Science and
stition were at one in regard to the horror. The sewer
ot less revolting to hygiene than to legend. The Goblin
had appeared under the fetid arch of the Mouffetard

sewer; the corpses of the Marmousets had been thrown into the sewer of the Barillerie; Fagon had attributed the fearful malignant fever of 1685 to the great gap in the sewer of the Marais, which remained yawning until 1833 in the Rue St. Louis, almost in front of the sign of the Gallant Messenger. The mouth of the sewer of the Rue de la Mortellerie was famous for the pestilence which came from it; with its pointed iron grating, which looked like a row of teeth, it lay in that fatal street like the jaws of a dragon blowing hell upon men. The popular imagination seasoned the gloomy Parisian sink with an indefinably hideous mixture of the infinite.

"One day in 1805, on one of those rare visits which the emperor made to Paris, the minister of the interior came to the master's private audience. In the carousal was heard the clatter of the swords of all those marvellous soldiers of the Grand Empire; there was a multitude of heroes at the door of Napoleon; men of the Rhine, of the Scheldt, of the Adige, and of the Nile; companions of Joubert, of Desaix, of Marceau, of Hoche, of Kléber. The whole army of that time was there in the court of the Tuileries, represented by a squad or platoon guarding Napoleon in repose; and it was the splendid epoch when the grand army had behind it Marengo, and before it Austerlitz. 'Sire,' said the minister of the interior to Napoleon, 'I saw yesterday the boldest man in your empire.' 'Who is the man?' said the emperor, quickly; 'and what has he done?' 'He wishes to do something, sire.' 'What?' 'To visit the sewers of Paris.'

"That man existed, and his name was Bruneseau.

"The visit was made. It was a formidable campaign; a night battle against pestilence and asphyxia. It was at the same time a voyage of discoveries. One of the survivors of this exploration, an intelligent working-man, then very young, still related, a few years ago, the curious details which Bruneseau thought it his duty to omit in his report to the prefect of police, as unworthy the administrative style. Disinfecting processes were very rudimentary at that period. Hardly had Bruneseau passed the first branchings of the subterranean

THE MADELEINE CHURCH, PARIS.

when eight out of the twenty laborers refused to go
The operation was completed; the visit involved the
; it was necessary, therefore, to clean, and at the same
measure; to note the entrance of water, to count the
and the mouths, to detail the branchings, to indicate
rents at the points of separation, to examine the
ve borders of the various basins, to fathom the little
ingrafted upon the principal sewer, to measure the
f each passage under the keystone, and the width, as
the spring of the arch as at the level of the floor;
determine the ordinates of the levellings at a right
th each entrance of water, either from the floor of the
from the surface of the street. They advanced with
. It was not uncommon for the step-ladders to
nto three feet of mire. The lanterns flickered in the
From time to time, they brought out a sewer-man
d fainted; at certain places, a precipice. The soil
nken, the pavement had crumbled, the sewer had
into a blind well; they found no solid ground; one
ddenly disappeared; they had great difficulty in
ring him. By the advice of Fourcroy, they lighted
oint to point, in the places sufficiently purified, great
full of oakum and saturated with resin. The wall, in
was covered with shapeless fungi, and one would have
ith tumors; the stone itself seemed diseased in this
rable medium.
y thought they recognized here and there, chiefly under
lais de Justice, some cells of ancient dungeons built
sewer itself. Hideous *in pace*. An iron collar hung in
these cells. They walled them all up. Some odd things
ound: among other things, the skeleton of an orang-
which disappeared from the Jardin des Plantes in
a disappearance probably connected with the famous
contestable appearance of the devil in the Rue des
dins in the last year of the eighteenth century. The
evil finally drowned himself in the sewer.
der the long, arched passage which terminates at the

Arche Marion, a rag-picker's basket, in perfect preservation, was the admiration of connoisseurs. Everywhere the mud, which the workmen had come to handle boldly, abounded in precious objects, gold and silver trinkets, precious stones, coins. A giant who should have filtered this cloaca would have had the riches of centuries in his sieve. At the point of separation of the two branches of the Rue du Temple and the Rue Ste. Avoye, they picked up a singular Huguenot medal in copper, bearing on one side a hog wearing a cardinal's hat, and on the other a wolf with the tiara on his head.

"The complete visitation of the subterranean sewer system of Paris occupied seven years, from 1805 to 1812. While yet he was performing it, Bruneseau laid out, directed, and brought to an end some considerable works. At the same time, he disinfected and purified the whole network. After the second year, Bruneseau was assisted by his son-in-law Nargaud.

"Tortuous, fissured, unpaved, crackling, interrupted by quagmires, broken by fantastic elbows, rising and falling out of all rule, fetid, savage, wild, submerged, in obscurity, with scars on its pavements and gashes on its walls, appalling,—such was, seen retrospectively, the ancient sewer of Paris. Ramifications in every direction, crossings of trenches, branchings, goose-tracks, stars as if in mines, cœcums, cul-de-sacs, arches covered with saltpetre, infectious cesspools, an herpetic ooze upon the walls, drops falling from the ceiling, darkness,—nothing equalled the horror of this old voiding crypt, the digestive apparatus of Babylon, cavern, grave, gulf pierced with streets, Titanic molehill, in which the mind seems to see prowling through the shadow, that enormous blind mole, the past.

"At present the sewer is neat, cold, straight, correct. It almost realizes the ideal of what is understood in England by the word 'respectable.' It is comely and sober; drawn by the line; we might almost say, fresh from the bandbox. At the first glance, we should readily take it for one of those underground passages formerly so common and so useful for

ight of monarchs and princes, in that good old time
the people loved their kings.' The present sewer is a
iful sewer; the pure style reigns in it; the classic rec-
r alexandrine, which, driven from poetry, appears to
taken refuge in architecture, seems mingled with every
of that long, darkling, and whitish arch. each dischar-
mouth is an arcade. If the geometric line is in place
here, it surely is in the stercorary trenches of a great
There all should be subordinated to the shortest road.
sewer has now assumed a certain official aspect. The
police reports, of which it is sometimes the object, are
ger wanting in respect for it. The words which char-
ize it in the administrative language are elevated and
fied. Villon would no longer recognize his old dwelling
e of need.

The excavation of the sewers of Paris has been a difficult
. Paris is built upon a deposit singularly rebellious to
an control. There are liquid clays, living springs, hard
s, those soft and deep mires which technical science calls
tardes. The pick advances laboriously into these calca-
s strata alternating with seams of very fine clay and
inar schistose beds, incrusted with oyster shells contempo-
with the pre-adamite oceans. Sometimes a brook sud-
ly throws down an arch which has been commenced, and
ndates the laborers; or a slide of marl loosens, and rushes
n with the fury of a cataract, crushing the largest of the
aining timbers like glass. Quite recently at Villette,
n it was necessary, without interrupting navigation and
hout emptying the canal, to load the collecting sewer
er the St. Martin Canal, a fissure opened in the bed of
canal: the water suddenly rose in the works under ground
ood all the power of the pumps; they were obliged to
the fissure, which was in the neck of the great basin, by
ns of a diver, and it was not without difficulty that it was
ped. Elsewhere, near the Seine, and even at some dis-
e from the river, as, for instance, at Belleville, Grande
; and the Lunière arcade, we find quicksands in which we

sink, and a man may be buried out of sight. Add asphyxia from the miasma, burial by the earth falling in, sudden settlings of the bottom, and the work of constructing sewers can well be understood to be dangerous."

In all that he has written, Victor Hugo has produced nothing more graphic than his description of Jean Valjean in the sewers of Paris, when endeavoring to escape from the police, after the fight at the barricades. We quote his description, omitting a few paragraphs.

"It was in the sewer of Paris that Jean Valjean found himself.

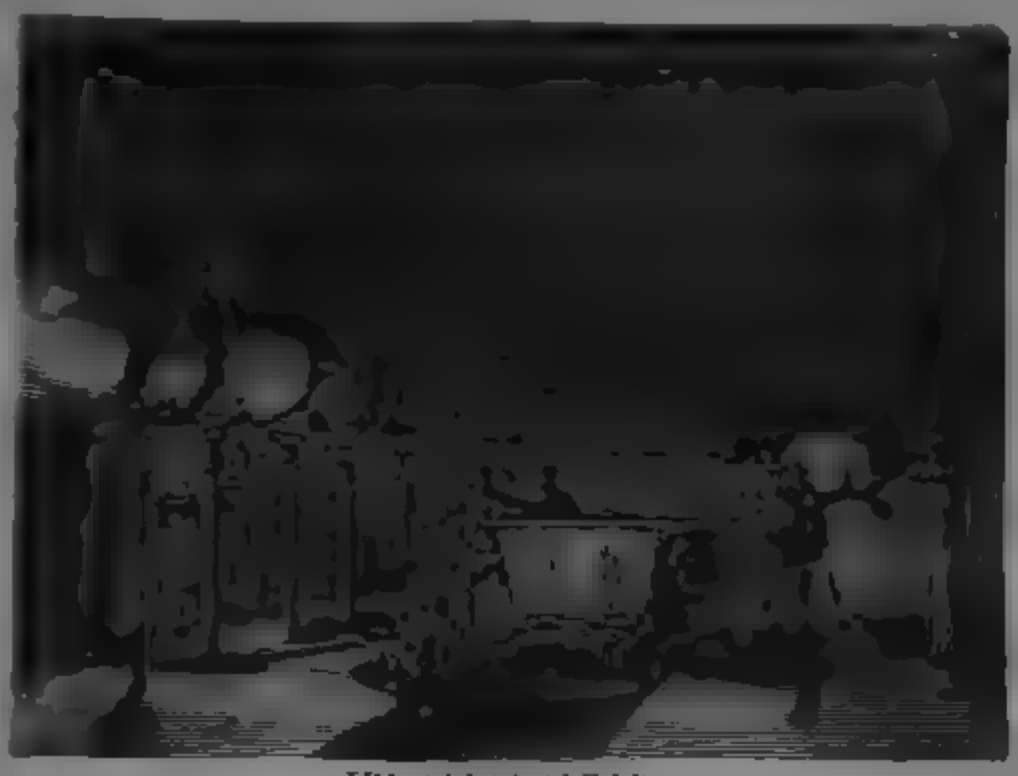
"A resemblance of Paris with the sea. As in the ocean, the diver can disappear.

"The transition was marvellous. From the very centre of the city, Jean Valjean had gone out of the city, and, in the twinkling of an eye, the time of lifting a cover and closing it again, he had passed from broad day to complete obscurity, from noon to midnight, from uproar to silence, from the whirl of the thunder to the stagnation of the tomb, and, by a mutation much more prodigious still than that of the Rue Polonceau, from the most extreme peril to the most absolute, security.

"Sudden fall into a cave; disappearance in the dungeon of Paris; to leave that street in which death was everywhere for this kind of sepulchre, in which there was life, was an astounding crisis. He remained for some seconds as if stunned; listening, stupefied. The spring trap of safety had suddenly opened beneath him. Celestial goodness had in some sort taken him by treachery. Adorable ambuscades of Providence!

"Only, the wounded man did not stir, and Jean Valjean did not know whether what he was carrying away in this grave were alive or dead.

"His first sensation was blindness. Suddenly he saw nothing more. It seemed to him also that in one minute he became deaf. He heard nothing more. The frenzied storm of murder which was raging a few feet above him only reached him, as we have said, thanks to the thickness of the



THE GREAT SEWER

SUBTERRANEAN PARIS

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ı which separated him from it, stifled and indistinct, and a rumbling at a great depth. He felt that it was solid ır his feet; that was all; but that was enough. He hed out one hand, then the other, and touched the wall oth sides, and realized that the passage was narrow; he ed, and realized that the pavement was wet. He ad- ed one foot with precaution, fearing a hole, a pit, some ; he made sure that the flagging continued. A whiff tidness informed him where he was.

After a few moments he ceased to be blind. A little light from the air-hole through which he had slipped in, and eye became accustomed to this cave. He began to dis- uish something. The passage in which he was earthed — ther word better expresses the condition — was walled up nd him. It was one of those cul-de-sacs technically called chments. Before him there was another wall, a wall ight. The light from the air-hole died out ten or twelve s from the point at which Jean Valjean stood, and cely produced a pallid whiteness over a few yards of the p wall of the sewer. Beyond, the opaqueness was mas- : to penetrate it appeared horrible, and to enter it seemed being ingulfed. He could, however, force his way into wall of mist, and he must do it. He must even hasten. ı Valjean thought that that grating, noticed by him under paving-stones, might also be noticed by the soldiers, and all depended upon that chance. They also could descend the well and explore it. There was not a minute to be

He had laid Marius upon the ground; he gathered him — this is again the right word, — replaced him upon his ılders, and began his journey. He resolutely entered obscurity.

The truth is, that they were not so safe as Jean Valjean posed. Perils of another kind, and not less great, awaited ı perhaps. After the flashing whirl of the combat, the ern of miasmas and pitfalls; after chaos, the cloaca. Jean ean had fallen from one circle of hell to another.

At the end of fifty paces he was obliged to stop. A ques-

tion presented itself. The passage terminated in another, which it met transversely. These two roads were offered. Which should he take? Should he turn to the left or to the right? How guide himself in this black labyrinth? This labyrinth, as we have remarked, has a clew — its descent. To follow the descent is to go to the river.

"Jean Valjean understood this at once.

"He said to himself that he was probably in the sewer of the markets; that, if he should choose the left and follow the descent, he would come in less than a quarter of an hour to some mouth upon the Seine between the Pont au Change and the Pont Neuf; that is to say, he would reappear in broad day in the most populous portion of Paris. He might come out in some gathering of corner idlers. Amazement of the passers-by at seeing two bloody men come out of the ground under their feet. Arrival of sergent-de-ville, call to arms in the next guard-house. He would be seized before getting out. It was better to plunge into the labyrinth, to trust to this darkness, and rely on Providence for the issue.

"He chose the right, and went up the ascent.

"When he had turned the corner of the gallery, the distant gleam of the air-hole disappeared, the curtain of obscurity fell back over him, and he again became blind. He went forward, none the less, as rapidly as he could. Marius's arms were passed about his neck, and his feet hung behind him. He held both arms with one hand, and groped for the wall with the other. Marius's cheek touched his, and stuck to it, being bloody. He felt a warm stream, which came from Marius, flow over him and penetrate his clothing. Still, a moist warmth at his ear, which touched the wounded man's mouth, indicated respiration, and consequently life. The passage through which Jean Valjean was now moving was not so small as the first. Jean Valjean walked in it with difficulty: The rains of the previous day had not yet run off, and made a little stream in the centre of the floor, and he was compelled to hug the wall to keep his feet out of the water. Thus he went on in midnight. He resembled the creatures of night

ng in the invisible, and lost under ground in the veins
e darkness.
[owever, little by little, whether that some distant air-holes
a little floating light into this opaque mist, or that his
became accustomed to the obscurity, some dim vision
back to him, and he again began to receive a confused
ption, now of the wall which he was touching, and now of
rch under which he was passing. The pupil dilates in
ight, and at last finds day in it, even as the soul dilates
sfortune, and at last finds God in it.
'o find his way was difficult.
'he track of the sewers echoes, so to speak, the track of
treets which overlie them. There were in the Paris of
day two thousand two hundred streets. Picture to your-
s below them that forest of dark branches which is called
ewer. The sewers existing at that epoch, placed end to
would have given a length of thirty miles. We have
dy said that the present network, thanks to the extraordi-
activity of the last thirty years, is not less than a hun-
and forty miles.
ean Valjean began with a mistake. He thought that he
under the Rue St. Denis, and it was unfortunate that he
not there. There is beneath the Rue St. Denis an old
sewer, which goes straight to the collecting sewer, called
Grand Sewer, with a single elbow, on the right, at the
nt of the ancient Cour des Miracles, and a single branch,
t. Martin sewer, the four arms of which cut each other
cross. But the gallery of the Petite Truanderie, the
nce to which was near the wine-shop of Corinth, never
municated with the underground passage in the Rue St.
s: it runs into the Montmartre sewer, and it was in that
Jean Valjean was entangled. There, opportunities of
g one's self abound. The Montmartre sewer is one of the
labyrinthian of the ancient network. Luckily Jean Val-
had left behind him the sewer of the markets, the geo-
ical plan of which represents a multitude of interlocked
allant-masts; but he had before him more than one em-

barrassing encounter, and more than one street corner — for these are streets — presenting itself in the obscurity like a point of interrogation; first, at his left, the vast Plâtrière sewer, a kind of Chinese puzzle, pushing and jumbling its chaos of T's and Z's beneath the Hôtel des Postes and the rotunda of the grain-market to the Seine, where it terminates in a Y; secondly, at his right, the crooked corridor of the Rue du Cadran, with its three teeth, which are so many blind ditches; thirdly, at his left, the branch of the Mail, complicated, almost at its entrance, by a kind of fork, and, after zigzag upon zigzag, terminating in the great voiding crypt of the Louvre, truncated and ramified in all directions; finally, at the right, the cul-de-sac passage of the Rue des Jeûneurs, with countless little reducts here and there, before arriving at the central sewer, which alone could lead him to some outlet distant enough to be secure.

"If Jean Valjean had had any notion of what we have here pointed out, he would have quickly perceived, merely from feeling the wall, that he was not in the underground gallery of the Rue St. Denis. Instead of the old hewn stone, instead of the ancient architecture, haughty and royal even in the sewer, with floor and running courses of granite, and mortar of thick lime, which cost seventy-five dollars a yard, he would have felt beneath his hand the contemporary cheapness, the economical expedient, the millstone grit laid in hydraulic cement upon a bed of concrete, which cost thirty-five dollars a yard, the bourgeois masonry known as *small materials;* but he knew nothing of all this.

"He went forward with anxiety, but with calmness, seeing nothing, knowing nothing, plunged into chance, that is to say, swallowed up in Providence.

"By degrees, we must say, some horror penetrated him. The shadow which enveloped him entered his mind. He was walking in an enigma. This aqueduct of the cloaca is formidable; it is dizzily intertangled. It is a dreary thing to be caught in this Paris of darkness. Jean Valjean was obliged to find, and almost to invent, his route without seeing it. In

eat unknown region, each step which he ventured might be the last. How should he get out? Should he find an outlet? Should he find it in time? Would this colossal subterranean sponge, with cells of stone, admit of being penetrated and pierced? Would he meet with some unlooked for knot of obscurity? Would he encounter the inextricable and the insurmountable? Would Marius die of hemorrhage, and he of hunger? Would they both perish there at last, and make two skeletons in some niche of that night? He did not know. He asked himself all this, and he could not answer. The intestine of Paris is an abyss. Like the prophet, he was in the belly of the monster.

"Suddenly he was surprised. At the most unexpected moment, and without having diverged from a straight line, he discovered that he was no longer rising; the water of the brook struck, coming against his heels instead of upon the top of his feet. The sewer now descended. What? would he then soon reach the Seine? This danger was great, but the peril of retreat was still greater. He continued to advance. It was not towards the Seine that he was going. The saddle-back which the topography of Paris forms upon the right bank, empties one of its slopes into the Seine, and the other into the Grand Sewer. The crest of this saddle-back, which determines the division of the waters, follows a very capricious line. The culminating point, which is the point of separation of the flow, is in the St. Avoye sewer, beyond the Rue Michel de Comte, in the sewer of the Louvre, near the Boulevards, and in the Montmartre sewer, near the markets. It was at this culminating point that Jean Valjean had arrived. He was making his way towards the belt sewer; he was on the right road. But he knew nothing of it.

"Whenever he came to a branch, he felt its angles, and if he found the opening not as wide as the corridor in which he was, he did not enter, and continued his route, deeming rightly that every narrower way must terminate in a cul-de-sac, and could only lead him away from his object, the outlet. He thus evaded the quadruple snare which was spread for him in

the obscurity, by the four labyrinths which we have just enumerated.

"At a certain moment he felt that he was getting away from under the Paris which was petrified by the *émeute*, in which the barricades had suppressed the circulation, and that he was coming beneath the Paris which was alive and normal. He heard suddenly above his head a sound like thunder, distant, but continuous. It was the rumbling of the vehicles.

"He had been walking for about half an hour, at least by his own calculation, and had not yet thought of resting; only he had changed the hand which supported Marius. The darkness was deeper than ever, but this depth reassured him.

"All at once he saw his shadow before him. It was marked out on a feeble ruddiness almost indistinct, which vaguely empurpled the floor at his feet and the arch over his head, and which glided along at his right, and his left, on the two slimy walls of the corridor. In amazement he turned round.

"Behind him, in the portion of the passage through which he had passed, at a distance which appeared to him immense, flamed, throwing its rays into the dense obscurity, a sort of horrible star, which appeared to be looking at him.

"It was the gloomy star of the police which was rising in the sewer. Behind this star were moving, without order, eight or ten black forms, straight, indistinct, terrible.

"During the day a *battue* of the sewers had been ordered. Three platoons of officers and sewer-men explored the subterranean streets of Paris; the first, the right bank, the second, the left bank, the third, in the city.

"The officers were armed with carbines, clubs, swords, and daggers.

"That which was at this moment directed upon Jean Valjean was the lantern of the patrol of the right bank.

"This patrol had just visited the crooked gallery and the three blind alleys which are beneath the Rue du Cadran. While they were taking their candle to the bottom of these blind alleys, Jean Valjean had come to the entrance of the gallery upon his way, had found it narrower than the principal

passage, and had not entered it. He had passed beyond. The policemen, on coming out from the Cadran gallery, had thought they heard the sound of steps in the direction of the belt sewer. It was, in fact, Jean Valjean's steps. The sergeant in command of the patrol lifted his lantern, and the squad began to look into the mist in the direction whence the sound came.

"Jean Valjean saw these goblins form a kind of circle. These mastiffs' heads drew near each other and whispered.

"The result of this council held by the watch-dogs was, that they had been mistaken, that there had been no noise, that there was nobody there, that it was needless to trouble themselves with the belt sewer.

"The sergeant gave the order to file left towards the descent to the Seine. If they had conceived the idea of dividing into two squads and going in both directions, Jean Valjean would have been caught. That hung by this thread. It is probable that the instructions from the prefecture, foreseeing the possibility of a combat and that the insurgents might be numerous, forbade the patrol to separate. The patrol resumed its march, leaving Jean Valjean behind. Of all these movements Jean Valjean perceived nothing except the eclipse of the lantern, which suddenly turned back.

"Slow and measured steps resounded upon the floor for some time, more and more deadened by the progressive increase of the distance; the group of black forms sank away; a glimmer oscillated and floated, making a ruddy circle in the vault, which decreased, then disappeared; the silence became deep again; the obscurity became again complete; blindness and deafness resumed possession of the darkness; and Jean Valjean, not yet daring to stir, stood for a long time with his back to the wall, his ear intent and eye dilated, watching the vanishing of that phantom patrol.

"He resumed his march, and after a time felt that he was entering water, and that he had under his feet pavement no longer, but mud.

"It sometimes happens, on certain coasts of Brittany or Scot-

land, that a man, traveller or fisherman, walking on the beach at low tide far from the bank, suddenly notices that for several minutes he has been walking with some difficulty. The strand beneath his feet is like pitch; his soles stick to it; it is sand no longer, it is glue. The beach is perfectly dry, but at every step he takes, as soon as he lifts his foot, the print which it leaves fills with water. The eye, however, has noticed no change; the immense strand is smooth and tranquil, all the sand has the same appearance, nothing distinguishes the surface which is solid from the surface which is no longer so; the joyous little cloud of sand-fleas continues to leap tumultuously over the wayfarer's feet. The man pursues his way, goes forward, inclines towards the land, endeavors to get nearer the upland. He is not anxious. Anxious about what? Only he feels somehow as if the weight of his feet increased with every step which he takes. Suddenly he sinks in. He sinks in two or three inches. Decidedly he is not on the right road; he stops to take his bearings. All at once he looks at his feet. His feet have disappeared. The sand covers them. He draws his feet out of the sand; he will retrace his steps, he turns back, he sinks in deeper. The sand comes up to his ankles; he pulls himself out, and throws himself to the left; the sand is half leg deep; he throws himself to the right; the sand comes up to his shins. Then he recognizes with unspeakable terror that he is caught in the quicksand, and that he has beneath him the fearful medium in which man can no more walk than the fish can swim. He throws off his load if he has one, he lightens himself like a ship in distress; it is already too late; the sand is above his knees.

"He calls, he waves his hat or his handkerchief; the sand gains on him more and more; if the beach is deserted, if the land is too far off, if the sand-bank is of too ill repute, if there is no hero in sight, it is all over; he is condemned to enlizement. He is condemned to that appalling interment, long, infallible, implacable, impossible to slacken or to hasten, which endures for hours, which will not end, which seizes you erect,

free and in full health, which draws you by the feet, which, at every effort that you attempt, at every shout that you utter, drags you a little deeper, which appears to punish you for your resistance by a redoubling of its grasp, which sinks the man slowly into the earth while it leaves him all the time to look at the horizon, the trees, the green fields, the smoke of the villages in the plain, the sails of the ships upon the sea, the birds flying and singing, the sunshine, the sky. Enlizement is the grave become a tide and rising from the depths of the earth towards a living man. Each minute is an inexorable enshroudness. The victim attempts to sit down, to lie down, to creep; every movement he makes inters him: he straightens up, he sinks in; he feels that he is being swallowed up; he howls, implores, cries to the clouds, wrings his hands, despairs. Behold him waist deep in the sand; the sand reaches his breast; he is now only a bust. He raises his arms, utters furious groans, clutches the beach with his nails, would hold by that straw, leans upon his elbows to pull himself out of this soft sheath, sobs frenziedly; the sand rises. The sand reaches his shoulders, the sand reaches his neck; the face alone is visible now. The mouth cries, the sand fills it; silence. The eyes still gaze, the sand shuts them; night. Then the forehead decreases, a little hair flutters above the sand; a hand protrudes, comes through the surface of the beach, moves and shakes, and disappears. Sinister effacement of a man.

"This fatal mishap, always possible upon one or another coast of the sea, was also possible, thirty years ago, in the sewer of Paris.

"The water filtered into certain underlying, particularly friable soils; the floor, which was of paving-stones, as in the old sewers, or of hydraulic cement upon concrete, as in the new galleries, having lost its support, bent. A bend in a floor of that kind is a crack, is a crumbling. The floor gave way over a certain space. This crevasse, a hiatus in a gulf of mud, was called technically *fontis*. What is a fontis? It is the quicksand of the sea-shore suddenly encountered under ground; it is the beach of Mont St. Michel in a sewer. The

diluted soil is, as it were, in fusion; all its molecules are in suspension in a soft medium; it is not land, and it is not water. Depth sometimes very great. Nothing more fearful than such a mischance. If the water predominates, death is prompt, there is swallowing up; if the earth predominates, death is slow, there is enlizement.

"Can you picture to yourself such a death? If enlizement is terrible on the shore of the sea, what is it in the cloaca? Instead of the open air, the full light, the broad day, that clear horizon, those vast sounds, those free clouds whence rains life, those barks seen in the distance, that hope under every form, probable passers, succor possible until the last moment; instead of all that, deafness, blindness, a black arch, an interior of a tomb already prepared, death in the mire under a cover! the slow stifling by the filth, a stone box in which asphyxia opens its claw in the slime and takes you by the throat; fetidness mingled with the death rattle; mire instead of sand, sulphuretted hydrogen instead of the hurricane, ordure instead of the ocean; and to call, and to gnash your teeth, and writhe, and struggle, and agonize, with that huge city above your head knowing nothing of it all!

"The depth of the fontis varied, as well as its length, and its density by reason of the more or less yielding character of the subsoil. Sometimes a fontis was three or four feet deep, sometimes eight or ten; sometimes no bottom could be found. The mire was here almost solid, there almost liquid. In the Lunière fontis, it would have taken a man a day to disappear, while he would have been devoured in five minutes by the Phélippeaux slough. The mire bears more or less according to its greater or less density. A child escapes where a man is lost. The first law of safety is to divest yourself of every kind of burden. To throw away his bag of tools, or his basket, or his hod, is the first thing that every sewer-man does when he feels the soil giving way beneath him.

"Jean Valjean found himself in presence of a fontis. A yielding of the pavement, imperfectly upheld by the underlying sand, had occasioned a damming of the rain-water. In-

filtration having taken place, sinking had followed. The floor, broken up, had disappeared in the mire. For what distance? Impossible to say. The obscurity was deeper than anywhere else. It was a mud-hole in the cavern of night.

"Jean Valjean felt the pavement slipping away under him. He entered into this slime. It was water on the surface, mire at the bottom. He must surely pass through. To retrace his steps was impossible. Marius was expiring, and Jean Valjean exhausted. Where else could he go? Jean Valjean advanced. Moreover, the quagmire appeared not very deep for a few steps. But in proportion as he advanced, his feet sank in. He very soon had the mire half-knee deep, and water above his knees. He walked on, holding Marius with both arms as high above the water as he could. The mud now came up to his knees, and the water to his waist. He could no longer turn back. He sank in deeper and deeper. This mire, dense enough for one man's weight, evidently could not bear two. Marius and Jean Valjean would have had a chance of escape separately. Jean Valjean continued to advance, supporting this dying man, who was perhaps a corpse.

"The water came up to his armpits; he felt that he was foundering; it was with difficulty that he could move in the depth of mire in which he was. The density, which was the support, was also the obstacle. He still held Marius up, and with an unparalleled outlay of strength he advanced; but he sank deeper. He now had only his head out of the water, and his arms supporting Marius. There is in the old pictures of the deluge a mother doing thus with her child.

"He sank still deeper, he threw his face back to escape the water, and to be able to breathe; he who should have seen him in this obscurity would have thought he saw a mask floating upon the darkness; he dimly perceived Marius's drooping head and livid face above him; he made a desperate effort, and thrust his foot forward; his foot struck something solid: a support. It was time.

"He rose, and writhed, and rooted himself upon this support

with a sort of fury. It produced the effect upon him of the first step of a staircase reascending towards life.

"This support, discovered in the mire at the last moment, was the beginning of the other slope of the floor, which had bent without breaking, and had curved beneath the water like a board, and in a single piece. A well-constructed paving forms an arch, and has this firmness. This fragment of the floor, partly submerged, but solid, was a real slope, and, once upon this slope, they were saved. Jean Valjean ascended this inclined plane, and reached the other side of the quagmire.

"On coming out of the water, he struck against a stone, and fell upon his knees. This seemed to him fitting, and he remained thus for some time, his soul lost in unspoken prayer to God.

"He rose, shivering, chilled, infected, bending beneath this dying man, whom he was dragging on, all dripping with slime, his soul filled with a strange light."

XXXVI.

MERCURY.

RTIES AND PECULIARITIES OF MERCURY, OR QUICKSILVER. — AMALGAMA-N. — CINNABAR. — WHERE IT IS FOUND. — ALMADEN AND OTHER MINES. CURIOUS CUSTOMS AT IDRIA. — MODES OF WORKING. — HUANCA VELICA. QUICKSILVER MINES IN CALIFORNIA. — CALIFORNIA LAWSUITS. — WON-RFUL PROPERTIES OF SPANISH TITLES. — AN UNHAPPY ACCIDENT. — PRAC-AL VALUE OF AN EARTHQUAKE — AN UNDERGROUND CHAPEL.

ɜE of the most valuable mineral substances is the one h is known as Mercury, or Quicksilver. It has many erties peculiar to no other metal. At an ordinary tem-ure it is a fluid. At thirty-nine or forty degrees below (Fahrenheit) it becomes solid, and resembles lead. At undred and sixty-two degrees (Fahrenheit) it boils, and own out on an invisible, transparent vapor, like steam. re it reaches the boiling point, if it is exposed to the air high temperature, it absorbs oxygen, and is converted red oxide. Strong nitric acid will absorb mercury. s affect it somewhat, but not to any great extent. It s with lead, zinc, gold, and silver, and it may be sepa-from them by a chemical process, and be made perfectly

Sometimes the cheap metals are used to adulterate ury; but the effect of this mixture is to produce an gam, whose adulterations can be easily detected. It is l sometimes in a native or pure form, and sometimes gamated with silver; but these instances are so rare that sits of this sort cannot be relied upon as sources of ly.

metimes mercury is found in its natural state in cavities e earth, so that it may be dug up in considerable quanti-

The chief source of supply, however, is in the form of

cinnabar. Cinnabar is said to be an East Indian name, originally given to the mixture of the blood of the dragon with that of the elephant, and afterwards applied to the common ore of mercury. On account of its beautiful red color, known as vermilion, this ore has been worked in various parts of the world for more than three thousand years. Some of the Roman historians refer to the use of mercury in amalgamating gold; and the mines of Almaden, in Spain, which still produce cinnabar, are known to have been worked for thousands of years before the Christian era. Cinnabar consists of eighty-six per cent. of mercury, and fourteen per cent. of sulphur. It forms beds and veins in certain rocks, and in many places the rocks near the veins will have cinnabar distributed through them. When finely ground it makes a brilliant red paint, and, as before stated, is known as vermilion; and it is said that the Indians of California first called the attention of the Spanish settlers to the presence of quicksilver by their use of cinnabar in ornamenting their faces.

The most important mines of mercury in the world are those of Almaden, in Spain; New Almaden, in California; Idria, in Austria; and Huanca Velica, in Peru. There are smaller mines in Hungary, Bohemia, Bavaria, China, Japan, Brazil, and a few other countries. Formerly the Almaden mines, in Spain, controlled the quicksilver market of the globe. The owners of the mines could affect the price of the article just as they pleased. If they raised or lowered it, the other mines were obliged to lower or raise their prices.

Almaden is situated in New Castile, about fifty miles north of Cordova. Apart from its mining peculiarities, it possesses no feature of attraction, as it consists simply of one long street, built on a ridge of rock, where the cinnabar ore is found. The town has a mining school, half a dozen or more ordinary schools, three hospitals, and a liberal supply of churches, and about ten thousand inhabitants. Until about the beginning of the present century the mines were worked by convicts, who were compelled to wear chains, and were

such severe toil that they never lived long. Later,
r, the mines have been worked on a voluntary labor
and employ about five or six thousand persons.
borer is required to toil only six hours a day. A
exposure than this to the quicksilver is considered
s to the health. The annual production of the Alma-
es is about two million pounds of pure metal.

nines of Idria, in Austria, are about thirty-two miles
ıst of Trieste. The town is a small one, its popula-
ıg less than five thousand. Its annual production is
ıree hundred thousand pounds. A single shaft has
nk to a depth of about one thousand feet. The
ions are made through horizontal galleries extended
s shaft. The descent into the mine is accomplished
y steps cut in the rock and partly by ladders. About
dred miners are employed. They preserved a pecu-
y wearing a uniform of their own, and, though the
ion is unhealthy, the appointment of a miner at Idria
y sought. The mines have been worked about four
years, and are the property of the government.
oduct of the other smaller mines of this metal
out Europe is so inconsiderable as to have no mate-
et on the market. The same may be said of the
ver mines of China, Japan, and Australia.

Peruvian quicksilver mines have been worked since
ming of the sixteenth century. At the great mines
ea Velica the ores are found in sandstone and shales
belt of ground or rock about four hundred feet thick.
the excavations are open ones, and appear as if laid
out much plan or method. Accidents frequently oc-
at one time two hundred workmen were buried by
ng in of the earth. The total annual yield of the
n mines is about four hundred thousand pounds.

ry is found in many places in Mexico, but no mines
now worked, the deposits not being sufficient to pay
exploitation. The quicksilver mines of California
st opened and worked in 1845, by one of the Spanish

settlers. It was known that for a long time the Indians had made use of cinnabar to ornament their faces, and it was found that they had made pits fifty or sixty feet deep into the mountain in search of it. The first attempt made by the Spaniards in these Indian mines was to work the cinnabar ore for silver; but no silver could be found. The war of 1846 stopped the working of the mine, and nothing was done after that until 1848, when operations were recommenced on a large scale. A company of Mexicans and English worked the mines from 1850 to 1858, when they were stopped by the United States court on account of a lawsuit about the title.

The New Almaden mines are situated about twelve miles from San José, an important town fifty miles south of San Francisco. It was my pleasure to visit these mines several years ago, and learn something of the mode of working them. A small party of us took the train from San Francisco, and proceeded to San José, whence we travelled in carriages over an excellent road, which undulated just enough to make it interesting. Unfortunately for us, at the time of our visit, no work was in progress in the lower mines in consequence of one of those lawsuits for which the region is famous. Consequently we did not go down into the mine itself, but were obliged to content ourselves with an inspection of the reduction works.

I may remark, by the by, in speaking of these lawsuits of the New Almaden mine, that it is a peculiar dispensation of providential care or human cupidity to afflict every valuable piece of property in California with a lawsuit. I would not wish to assert that there is a dishonest man in all California, as the assertion might be followed by an assault on the writer by some enthusiastic resident of the Golden State; but I do say that the result of my observation was, that nothing could be found in California worth the having but that some claimant under a previous title would be sure to present himself. The New Almaden mines, as soon as their value became known, found plenty of claimants under Spanish titles and Indian titles. A great part of their revenue has been swal-

QUICKSILVER MINES OF NEW ALMADEN.

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up in legal proceedings. When all these questions have been settled finally, I presume some claimant will up who holds a title given him by Columbus or Queen a, and possibly by the founder of the Christian religion. in California can go back to a wonderfully distant and they are always so indefinite as to afford holding- l for a legal anchor.

not think a single mine or very valuable property in nia has ever escaped legal difficulties. A rocky island Francesco Bay was pointed out to me as the locality of ish claim. It had stood very quietly unoccupied, and t considered worth ten cents for any practical purpose. by the government wished to use it as the site of a ation. Immediately there arose a claimant under a h title, and he came very near compelling the govern- to pay him a handsome price for the property. I pre- if a volcanic island should be thrown up in the middle bay, and somebody should take possession of a piece somebody else would have a Spanish or Indian title to would possibly produce a title from his Satanic Majesty, had caused the island to be made for the especial benefit claimant, in return for valuable services rendered in past or present.

reaching the mines, we proceeded at once to the Reduc- Works, and were politely shown around by Mr. Butter- , the superintendent. We amused ourselves trying to ks of quicksilver, and were nearly choked with the arising from the places where the ore was being re- . The reduction works are very simple affairs. They t of piles of brick with furnaces beneath them, and large cavities, down which the ore is placed. The ore ted, and the mercury rises in vapor, and is condensed. furnaces are, most of them, forty feet long, eight feet and ten feet high, and fixed near each other. Each is divided into compartments, the fire occupying one and a little below the compartment, where the ore d. The heat does not come in direct contact with the at is driven through it by means of flues.

There are several Condensing Chambers, so called, each of them eight feet long, four feet wide, and about six feet high. The chamber where the ore is placed is connected with the condensing chambers by means of a flue. Eight or ten tons of ore are placed in the furnace at one time. Seven other condensing chambers succeed the first, and the fumes are passed through one after the other, and finally into a tank, where they are condensed in water. Each chamber is so constructed that the mercury will flow into the iron tank, where it is collected and put in flasks. About sixty hours are required to extract the mercury from a charge of ore.

In spite of all precautions a great deal of mercury is lost At the time of our visit, new furnaces had been constructed to take the place of some old ones, which had been torn down a year or two before. They showed us an immense cavity in the earth, where the quicksilver had accumulated and settled. Its weight had made places for it in some instances, while in others the ground was thoroughly saturated. These deposits were discovered quite by accident, and I was told that several tons of quicksilver had been taken from them.

One of our party became aware of the peculiar properties of quicksilver in a way that was not at all satisfactory. At the tank where the material was waiting to be placed in the flasks there were several gallons of mercury, and we amused ourselves by forcing our hands beneath the surface. The sensation was peculiar, and to most of us entirely new. Our friend was wearing a ring on one of the fingers that he thrust into the metal. The quicksilver allied with the gold, and suddenly it was discovered that the ring had turned white. His attention was called to it by our guide, who suggested that the ring must be removed instantly and heated. It was taken from the finger, not without considerable difficulty, placed upon a shovel, and heated. A goodly portion of the mercury, which had adhered to it, was driven away: but I believe the ring subsequently tumbled to pieces, and became valueless.

len and animals employed about the Smelting Works are rated and otherwise injuriously affected by the mercury; I believe no like effects are experienced in the mines. ore is found irregularly distributed in the hills a little e than a mile from the smelting works. The vein is very gular; in fact, it is less a vein than a series of chambers. mine is entered through a level, which extends twelve dred feet into the hill. Side galleries are excavated on line of deposits, and sometimes they follow these deposits or five hundred feet. The earthquake of 1865 opened everal new chambers in the rock, and gave an increased e to the property — about the only property which an hquake was ever known to benefit. Most of the laborers nese mines are of Indian or Spanish origin. They have a pel in the mine, similar to chapels which are fitted up in mines of Catholic countries all over the world. The nbers of the mine are occasionally used for *fêtes* and celeions, and at such times are quite interesting.

he quantity of quicksilver produced annually at the New naden mine is about two million pounds. Sometimes it short of this amount, and sometimes exceeds it: but the luction is largely in the control of the managers, and they raise or lower it almost at will. The stock of this comy has been the subject of a great deal of speculation in ll Street. Some men have made money by it, and others e lost. The speculations in it have been so extensive that as become a sort of financial football, which prudent peowould do well to let alone.

he New Idria mine was opened subsequently to the openof the New Almaden mine. The mercury of New Almahad driven that of Spain from all the American markets, fairly controlled the world. The mine at Idria, together h mines at other places in California, produced a comparaly small amount, so that the market of the New Almaden e was not seriously affected.

universal system is followed over the entire globe, so far he packages in which mercury is placed are concerned.

The Almaden mines of Spain adopted the plan of enclosing the mercury in iron flasks, containing seventy-six and one half pounds, and the example is followed elsewhere. Sometimes half flasks and quarter flasks are made; but the standard of seventy-six and a half pounds for a whole flask is universally maintained.

The greatest consumers of mercury are the Chinese, not physically, or for mechanical or chemical purposes. The Chinese use a great many paints, and especially red ones. As a natural consequence, quicksilver enters largely into their composition. Other uses of quicksilver are in the extraction of silver and gold from their ores in the amalgamating process, and also for coating or silvering the backs of mirrors. Mercury is employed in the construction of philosophical instruments, and is preferred to other fluids for filling thermometers and barometers. It is used in medicine to a considerable extent; and doubtless many of my readers are familiar with it. Its most general form is in what is known as the blue pill. Nearly all physicians prescribe it, but they always enjoin great caution in its use. One celebrated medical writer says, "Few medicines produce such a marked sense of depression, both mentally and bodily, as mercury, even of ordinary doses; and when the system is brought thoroughly under its influences, the effects become distressing."

XXXVII.

GUANO AND THE COOLIE TRADE.

ND ITS CHARACTER. — WHERE IT IS FOUND. — THE CHINCHA ISLANDS THEIR WEALTH. — NOVEL PLANS OF THE PERUVIANS. — HOW THEY DIG OAD GUANO. — EFFECT OF GUANO ON A STRANGER. — JARVIS'S AND AND'S ISLANDS. — THE COOLIES AND THEIR LABOR. — STORIES OF HOR- CRUELTIES. — HOW THE ASIATIC SLAVE TRADE IS CONDUCTED. — MU- ON SHIPBOARD. — MURDER OF THE CREW. — HUMAN MINCE MEAT. — TMENT OF COOLIES AT WORK. — EXTENT OF THE COOLIE TRAFFIC. — ABLE FATE OF MISSING SHIPS.

exhausting effect of agriculture, in many localities, s it necessary to furnish the soil with enriching mate- From time immemorial, use has been made of the excre- of animals, of deposits in bogs and swamps, where ble matter has decayed, and of various mineral sub- s known to contain ingredients nutritious to growing

An important ingredient of nearly all manures is the nce known as ammonia, which is contained in large ties in the excrement of birds. Any farmer will tell at the space beneath his hen-roost furnishes a material valuable, pound by pound, than any other part of his rd establishment. In some parts of the world the ex- t of birds is found in large quantities, but these places in number, for the reason that they are only in dis- where there is no rain. In localities subject to rain, gh the birds may be numerous, the valuable material is l away, or, at all events, is so greatly reduced in quality ender it worthless or nearly so.

great deposits of bird excrement, popularly known as are in tropical regions, the most important of them at the Chincha Islands, which are situated in the Pa-

cific Ocean, near the coast of Peru, in latitude 13° 38′ south, longitude 76° 28′ west. They are three in number, and are small, rocky, and perfectly dry. They appear to have been formed by separate inundations of lava under great pressure, and are composed of a gray and reddish colored rock that in some places presents a perpendicular wall three hundred feet above the surface of the ocean. The islands have a wild and picturesque appearance. Immense flocks of sea-birds are constantly flying around them. The walls of the islands are full of caves and arches, some of them very high, and the beating of the waves in the caves and arches can be heard a long distance.

The islands are small, no one of them being more than a mile in length. The total amount of guano upon them is estimated at forty millions of tons. It has been accumulating during thousands of years. In some places the depth is estimated at more than a hundred feet, and over nearly all the extent of the islands it is rarely at a depth of less than sixty feet. The value of guano was well known to the Peruvians of ancient times, and these immense deposits were specially cared for by the government. By command of the incas of Peru no person was allowed, under penalty of death, to visit the islands during the breeding season of the birds, and the same penalty was inflicted upon those who killed birds at any time of the year.

According to the histories, five hundred years were required for the formation of a single inch in thickness of guano; consequently, the time required for the formation of a layer of guano a hundred feet thick must be something more than the period of life allotted to Methusaleh, or any of his contemporaries.

The attention of Europe was first called to guano in 1804, by the great traveller Humboldt. He caused the substance to be analyzed, and found that it was composed of phosphates of ammonia, lime, and urate and oxalate of ammonia, together with other organic matters not determined. A few years later further attention was called to it by Sir Humphry

', who suggested that it might prove valuable to farmers; it was soon after tried at St. Helena. The first ship- ever brought to Europe was in 1840, and consisted of ty casks. It was tried, and found useful; and the next several cargoes were taken to England, and several more e United States. The exclusive right of digging and ing guano for the term of nine years was sold at this by the government, for forty thousand dollars; but it repudiated soon after, as the increased demand for guano loped its immense value. The monopoly was, however, ed in a little while, one firm being allowed the exclusive with England, and another with the United States. The nd increased so rapidly that a great many ships went he carrying trade, and sometimes as many as two hun- ships have been waiting at the Chincha Islands for their es.

plorations were made for other deposits, and some rich were found on the Lobos Islands, off the north coast of . A great many smaller islands were found to be cov- with guano, and in various parts of the Pacific Ocean are extensive deposits. The most important of these pon Jarvis's, Baker's, and Howland's Islands, situated in South Pacific Ocean, belonging to a New York company, named after American merchants interested in them. Jar- Island was estimated a few years ago to contain nearly millions of tons; the quantity on Baker's and Howland's ds was not determined.

show the rapid increase in the demand for guano, it may entioned that, in the year 1841, six thousand five hun- tons were exported from the Chincha Islands, and in the following years, one hundred and twenty-seven thousand were exported, — or an average of more than thirty-five sand tons a year.

1849 the exports of guano were nearly a hundred thou- tons, and from 1852 to 1857 the yearly average was than two hundred thousand tons.

ne value of guano varies according to the demand, but is-

ordinarily fixed at about seventy dollars a ton. It is sufficiently valuable to induce enterprising men to adulterate it; and more than half the guano sold in England and the United States is said to be mixed with inferior substances before it reaches the consumer. Nearly all dealers who purchase large quantities require a careful analysis of samples before they close their bargains. The analysis of guano is very desirable for the farmer, in order to indicate the best method of applying the fertilizer, and to ascertain for what crops and to what soils each kind is best adapted. For example, some soils might be most benefited by the Peruvian guano, which contains large quantities of ammonia; while others would be most benefited by the cheap qualities, which contain larger quantities of phosphate. Full details respecting the guano trade and the use of guano are contained in the document accompanying the message of the President of the United States to the Senate, February 5th, 1859.

Another locality where guano is found is in the Caribbean Sea, near the coast of Venezuela; but the islands containing this guano are in the region of tropical rains, and consequently the substance formed there is quite different in character from the dry, pulverized guano of the Chincha Islands. Some of these Caribbean islands are low, and covered with sand, shells, and other substances, in which the birds lay their eggs. Others rise in peaks to the height of several hundred feet: and on these peaks there are rocky layers which have been formed from guano. These rocky layers contain large quantities of phosphate and carbonate of lime. Other layers contain very little carbonate and a larger proportion of phosphate. Another variety is a solid rock, which forms a crust sometimes two feet thick, and consists mainly of phosphate and sulphate of lime. The evaporation of the ammonia and similar substances renders this rock porous, and has led many to believe that it was of volcanic origin. The heat and moisture of the surface have made wonderful changes in the organic substances or deposits of these islands; though the formation of these rocks can be directly traced to the excrement of birds and

the remains of the birds themselves, all vestiges of animal life have disappeared, and the substance presents all the characteristics of a metamorphic rock, dug from the base of a volcanic mountain.

The work of handling guano is not the most delightful in the world: especially is this the case at Chincha Islands, where the air is dry, and the guano is in the form of dust, or of a hard material which easily separates into dust. Guano has a very pungent character, and causes the eyes to inflame, and sometimes deprives them altogether of the power of sight.

As before stated, the Chincha Islands number three only, and are known as North Island, South Island, and Middle Island. The Middle Island is the most important, not only for having the largest quantity of guano upon it, but also for being the residence of the commander and deputy commander of the three islands. The palace of the commander is rather an imposing building of its character; and at a little distance stands that of the deputy commander. This is more modest and unpretending in architecture, being nothing more nor less than what Americans would term a flat-roofed shanty, constructed of cane and rush matting.

The average height of the rock which is the sub-strata of the island, is from one hundred and fifty to two and three hundred feet; and upon these rocks lie the guano as upon a scaffolding or platform rising out of the sea. The guano on this island lies on what may be termed a smooth, rounded mound, and is in some parts about one hundred and sixty feet thick. More than forty acres have been cut away from the side of the hill nearest to the vessels on which the guano is shipped. The birds which live and die upon these islands are principally of the Photo-Huenco species, and resemble blue and white pigeons with red bills. The white birds keep themselves separate from the blue, and hundreds of acres of land are completely covered with them. In addition to these, there are a number of sea-lions also to be found on these islands, which contribute somewhat to the quantity of ammonia created by the birds. Eggs and wings of birds, and teeth

of sea-lions, are seen in abundance changed into ammonia in each and every part of the islands.

The guano, when exposed to the air, is of a reddish brown-yellow color, which covers the whole of the three islands, and nothing else is to be seen but the rocks on which it rests. In substance it is like light, dry earth, and is very difficult to walk upon. Frequently one finds himself sinking ankle and knee deep; and should you attempt to hurry, you are almost sure to lose your footing. Should you fall and get covered with this ammonia, it matters but little, as it is pure, and contains no animal substance to make it disagreeable. If you penetrate a few feet below the surface of the ammonia, it is found to be perfectly compact, and not unlike castile soap.

The men employed to dig the guano are Chinese. They have a very hard time of it; and in addition to being hard worked, they are very badly treated. Close to the residence of the deputy commander a number of the coolies are engaged digging out the guano for shipment. The gang is superintended by the most unfeeling task-masters, who apply the lash very freely to the naked backs of the workmen on the slightest pretence. It is by no means an unfrequent occurrence to see half a dozen coolies lying about the scene of operations dead, or in their last throes of agony; and not the slightest sympathy is extended to them in their suffering. Bodies are left exposed all day in the open sun, where they may be found covered with flies or vermin; and sometimes in a few hours there are large holes in these bodies, pecked by hundreds of birds.

At the edge of the principal cutting on Middle Island, coolies are found working with their pickaxes, while others convey the guano in barrows to the side of the cliff where the vessels are in readiness to receive it.

There are about fifteen hundred men constantly engaged in cutting out the guano. As above stated, these men are coolies, and the overseers are negroes, stationed at short distances apart, and provided with heavy whips. The coolies work with no other covering than a thin pair of pantaloons.

As they are lashed by their task-masters, their cries are painful. The officers are frequently eye-witnesses of these tortures, but give them very little attention.

As soon as the guano is dug up, it is carted to the depot or open enclosures called the Margueras, and thence to the launches or vessels. These margueras are made of strong canes, resembling a palisade round a prison, and are supported by chain cables. In some parts of the islands, when the distance is far from the depot, the guano is conveyed there in cars drawn by donkeys, but generally the coolies have to wheel it themselves. Each man is expected to dig and wheel five tons of guano per day, and if he does not do this amount of work, he is severely flogged in the presence of his fellow-workmen at the close of the day's labor. The extent of punishment is always left to the discretion of the task-masters, who appear to be destitute of mercy The men are paid one real (twelve and a half cents) per day, and their rice; but should their task not be completed, in addition to the flogging, the defaulter has part of his wages deducted.

While at work they are compelled to wear thick bandages over their mouths, owing to the strength of the ammonia. When the guano is wheeled to the depot, it is pushed down to the lower end of the margueras, where there are a number of openings connected with shutes, or long canvas pipes. These shutes are about the size of an ordinary barrel, and lead down to the base of the hill or cliff, and then into the vessels.

Sometimes the ships are loaded from the side, the guano being hoisted in bags; but this process of loading occupies too much time, and is never resorted to except in cases of necessity. When the guano is poured directly into the hold, a vessel can be loaded in a day or two; whereas, by hoisting it in, it occupies as long as two or three weeks to make up a cargo.

While the ships are being loaded, — and generally there are a large number at the same time, — they present a very interesting appearance. An ordinary visitor would at first imagine

that they were on fire, owing to the yellow smoke or dust which rises during the loading.

The air is so thoroughly impregnated with the ammonia that at times one might reasonably think he had a bottle of strong hartshorn under his nose, and most people suffer much from the effect it has upon their eyes and lungs. It has often been the subject of remark how the coolies can stand this great tax upon their eyes and lungs daily, particularly when they are so hard worked. The digging of guano is much harder than that of ordinary railway digging and mining work.

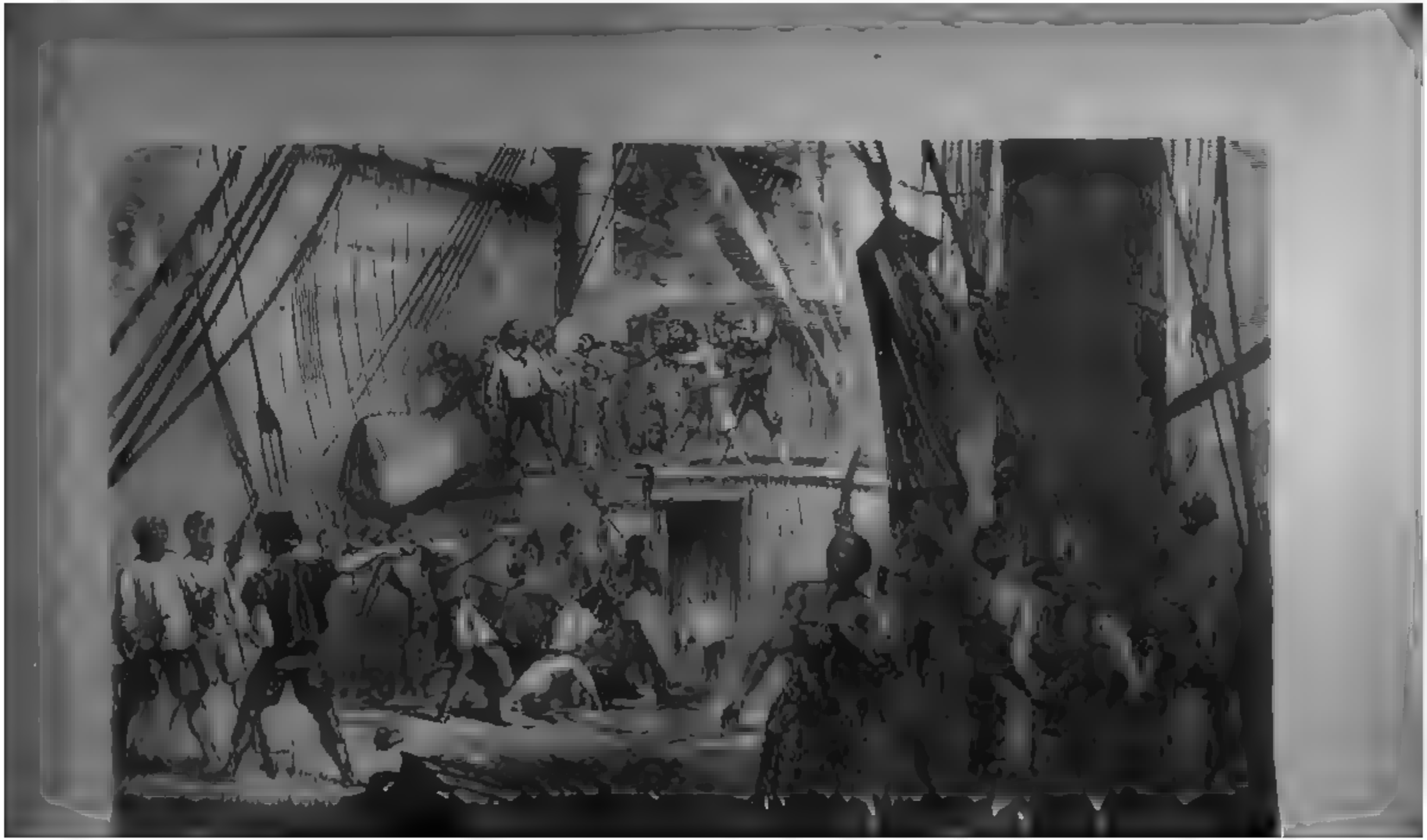
When a vessel has received its full cargo, there is a little rejoicing, and the men are permitted to leave their work for a short time. One of the crew of the loaded vessel goes to the yard-arm in a tub; three cheers are given by all the other ships, and their guns are discharged.

The coolie laborers are required to work every day in the week, Sundays included, excepting those laborers under the immediate charge of the commander. If there is a rush in getting the vessels loaded, and it becomes necessary for his men to work on Sunday, he pays them extra for their labor; but it is not so with the other laborers.

On the islands there are several rude huts, where reside doctors, overseers, and nondescripts of various sorts. There are also several groceries, cooking stores, candy shops, and various sheds, which present a picture of a small village of hovels.

The men complain that they have no protection afforded them, and their emaciated appearance goes to show that they are not over fed, and are badly used.

There is hardly a laborer to be found on the whole islands without large welts on his back, made by the thongs of the task-master. The men present a striking similarity to a used-up horse, their bones almost protruding through their skin. The small pittance that these coolies earn is kept from them, and when one of them has served the time mentioned in his contract, he finds his master has a claim against him for luxuries supplied during his term of service, and being unable to pay him, he has to resume work, as before.



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get any rest whatever, and they may be said to live like dogs. No women are allowed among them, ng thus deprived of feminine society, in addition to ner sufferings, many commit suicide, believing that rits will wake in their native land.

istory of the coolie trade may be found interesting in nection.

year 1847, a Portuguese vessel, named the Don Pedro, the port of Macao, China, waiting for a cargo. The found that it would be several months before a new tea would come in, and consequently he would be to wait some time before his ship could be loaded. itering about Macao he fell in with a Spaniard who ne over from Peru on business, and the conversation d to turn on the cheapness of labor in China. It oc- the Spaniard that it would be a good thing to take a l Chinese to Peru, and finally it was decided to at- load the Don Pedro with these men. Whether they y contract with the coolies is not known, and probably er be ascertained. Three hundred men were ex- tensibly for Java, and on the 1st of June, 1847, they om Macao, supposing they were going to Java, but stined for Peru.

hip was steered across the Pacific, and after a voyage than a hundred days, with a great many vicissitudes, short allowance of food and water, the coolies were n Peru. Owing to some misunderstanding and some about the contract, this first consignment was not the Chincha Islands, but was placed on a plantation lao. They had been secured for five years' labor, and niard who brought them from China disposed of his dise to such good advantage that he immediately re- for another cargo. Not only did he go for another ut for several cargoes, and the story of his success, advantages to be obtained by coolie labor, spread rap- ough South America, Australia, and other parts of ld.

The trade increased with wonderful rapidity. Rumors went about in China that the coolies were taken to the other side of the world, and were murdered as soon as their labor contract was ended. In consequence of this rumor it was difficult to obtain men voluntarily, and the dealers were obliged to buy or steal men. A system very much like the African slave trade, with a few additional horrors, speedily grew up.

The Portuguese and Spanish traders at Macao established slave pens, like those in Africa, and bought men and women just as they might buy cattle. Bands of robbers went into the country, seized the men at work or at their houses, bound and forced them into boats, took them to Macao, and sold them. Robbers infested the mountains, stealing men in preference to anything else. Sometimes fathers and mothers sold their sons, and sometimes an enterprising youth brought his able-bodied father to market, sold him to a trader, and went home with a fortune of ten dollars in his pocket.

The price varied from five to ten dollars a head. Sometimes there was a scarcity in the market, and prices advanced; and then again would come a "bear" movement; large quantities would be offered, and prices went down.

Chinese junks, known as lorchas, were sent up the bays and rivers to bring away the marketable inhabitants of the rural districts. From Macao the traffic was carried to other ports, so that five years after the first voyage of the Don Pedro, vessels were waiting for cargoes of coolies at half a dozen ports.

A writer on China says, that about this time "the coolie trade caused a civil war in some of the provinces, just as the slave trade causes a constant warfare between various tribes in Africa." During the most prosperous years of the coolie trade the mandarins and village chiefs used to connive at the robberies, and sometimes they sent their personal attendants to assist in the capture of citizens of their own town.

If they had a spite against any one, or considered that he ought to be out of the way, they combined business with pleasure by assisting to sell men to the coolie traders.

In 1854 the extensive traffic and the cruelties practised came to the ears of various governments; one after another the civilized ones forbade their ships to engage in it, and from that time the business declined, though it by no means entirely died out. The wholesale capture and sale of men have been greatly restricted, and at the present time the traffic is confined to Macao, where prisoners taken in the civil war are sold, and where certain captives taken by the lorchas find a market.

One mode of obtaining men is by coaxing them into gambling-houses, and inducing them to play for money until they have lost an amount beyond that they have about them. They are then required to sign bonds which hold them as securities for their debts. With these bonds they can be turned over to a coolie-trader, who has a depot or private jail of his own, where he locks up his human securities. When a sufficient number is accumulated, the men are sold to the exporters.

From 1847 to 1870, the number of coolies or forced laborers taken from China to Cuba was one hundred and thirty thousand, to Peru two hundred thousand, and to Australia, Java, and other parts of the Indian Ocean, about fifty thousand. These do not include voluntary emigrants, nor any of the coolies taken to India or the Sandwich Islands; neither does it include a good many ship-loads known to have been sent away, but of which no record exists. Together not less than half a million coolies — and some persons, familiar with Chinese affairs, say nearly a million — have been taken away by this Asiatic slave trade. The men are bound by contracts to a service of eight years, the contract stipulating that at the end of that time they are free to return to their homes, that they shall receive a certain amount of money, and their return passage shall be paid; but such are the cruelties practised in Peru, Cuba, and other countries, that not one man in five hundred ever returns to China.

The treatment of the coolies on shipboard is quite as severe as that of African slaves. They are crowded densely

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one instance the bodies of officers and crew of a coolie were literally cut into mince meat before being thrown)oard. One of the survivors afterwards stated that there not a piece of any one of the murdered persons that hed more than two or three pounds, when the mutiny)nded.

one occasion a ship sailed from Macao, and had made y two thirds of the voyage to the Chincha Islands when tiny occurred. The fight was long and severe. A part e crew were surprised and killed on deck, the remainder below and suffered great torture for several hours. The es obtained complete possession of the ship, and one by he prisoners below were brought up and murdered.

hen this work was ended the men turned the ship's head ina, and for days drifted in a helpless sort of way, know- nothing about navigation, and allowing the sails to be n to pieces, and the ship rendered helpless.

ter nearly two months floating about, they finally arrived e of the ports of Japan. On the voyage they had sev- times quarrelled among themselves, and their quarrels led to bloodshed, in which many of their number were l. The survivors were arrested and taken to prison by apanese. They were finally sent back to China, to be with by their own authorities. Some of them were ex- d, and others were imprisoned for various periods.

XXXVIII.

AVONDALE.

THE GREAT CALAMITY IN PENNSYLVANIA. — ITS CAUSE. — DISCOVERY OF THE FIRE. — SCENES AT THE MOUTH OF THE MINE. — BURNING OF THE BREAKER. — DESCRIPTION OF THE FIRE. — EFFORTS FOR RESCUE. — THE DOG AND LAMP. — DESCENT OF THE SHAFT. — WHAT THE EXPLORERS SAW. — DISCOVERY OF THE BODIES. — AFFLICTION OF FATHER AND SON. — BRINGING OUT BODIES. — BURIAL OF THE DEAD.

In a former chapter a brief allusion was made to the terrible disaster at Avondale, Penn., where nearly three hundred lives were lost. Public attention was everywhere called to the disaster at the time of its occurrence; the daily and weekly journals were filled with details of the incidents at Avondale, and the illustrated papers vied with each other in giving pictorial representations of the horrifying scenes. To many readers the accounts of the time are doubtless still fresh in memory, and will remain so for years to come.

Avondale, the scene of the catastrophe, is about four miles from Wilkesbarre, and the same distance from Plymouth, and is situated on the right bank of the Susquehanna, in Luzerne County. Near Avondale the scenery for some distance is quite pleasing to the eye, and has often been praised by tourists. At the time of its occurrence the accident was called "The Unparalleled Disaster," and very properly so, for never before and never since has it seen its equal in the United States.

The fire broke out on the morning of Monday, the 6th day of September, 1869. It was thought by many persons that the fire was the work of an incendiary, and to this day there are some who adhere to this theory, although no evidence was ever obtained to warrant such a belief. The idea rose

he fact that, for nearly two months before the disaster, ners had been on a strike for an increase of wages, which employers had refused to grant, and the men were com- to give up the contest in consequence of the exhaustion ir funds. It was on the first morning of the resumption ck inside the mine that the fire broke out, and at a time nearly three hundred men and boys were at work.

Avondale Mining Works were built in 1867, and at ne of their destruction yielded a supply of about four ed and fifty tons of coal daily. The mouth of the mine hundred feet up the side of a mountain, and over it ected a large building, known in mining parlance as the ker." Here were also the engine-rooms, and the ma- y for breaking and screening coal as it comes up from ne. Above this entrance the ground rises at an angle y-five degrees, the town of Plymouth lying to the north. this point there is a charming view of the valley of the ing. On both sides of the mine are mountains, which far away to the north and south, while meadows and s slope gently to the edge of the river, which meanders h the valley.

ut eight o'clock on the morning of the disaster, some vorking in a field near the breaker, observed a bluish rising, but paid no attention to it, knowing that the had resumed work. An hour or so later the keeper stables in the mine took a quantity of hay for his mules the shaft, and on his way nothing attracted his atten- but as soon as he reached the bottom he discovered fire. once gave an alarm: and at the instant his cry was a column of flames shot with terrific fury up the ve a- and into the engine-room. So great was the heat, that, the engine-man could reverse or stop the engine, he was from his post, and in a very short time the breaker and ildings were a mass of flames. The hoisting apparatus, y avenue for the escape of the miners, was completely ed, while there were two hundred and fifty persons

The only way to get air into the shaft was through

the main opening, — in fact, the only opening, — and this was found to be partly filled with burning timbers and *débris*. Before the flames could be stopped the shaft was partly filled up, and all communication with the miners was cut off.

Immediately after the fire broke out there was the greatest excitement around the entrance to the mine. For a time everybody appeared to have lost his reason, and men were rushing to and fro, not knowing what to do. But this state of things did not last long, and confusion speedily gave place to order, or at any rate as much of it as could be expected at such an occurrence. Despatches were sent to different places, and soon the fire departments of Scranton, Wilkesbarre, Kingston, and other cities were on their way to the scene of the conflagration, where, it is needless to say, they did good service, and were gladly welcomed. In a few hours thousands of people were journeying to the Avondale mine, some as sight-seers, and others to render what aid they could to the poor fellows known to be below. The neighboring mines suspended operations, and master and men joined heartily in the work of rescue. When the fire department arrived, it was thought impossible for the men below to be alive, as they were supposed to have been suffocated; yet there was a hope of their reaching some retreat in the inner chambers of the mine, and it was determined to lose no time in attempting a rescue of the miners at all hazards.

The shaft, which was lined with wood, was ten feet by sixteen feet square, and about three hundred and fifty feet deep. A partition extended from the top to the bottom, forming a flue for the foul air to pass out of the mine. It was up this wooden box or chimney that the fire first came, and, as it was separated from the main shaft, the stable-man could not discover the fire on his way down.

In order to purify the air in a coal mine like the one at Avondale, it is necessary to force out the foul vapor; and, in addition to the fans used, it is customary to build fires at the bottom of the shaft, in order to get rid of the "damp." When the mine is in operation these fires are never allowed

to go out. When work is resumed after a suspension, care is necessary in kindling the fire. As before stated, there had been a strike among the miners, and work entirely suspended at the mine. The fire at the bottom of the shaft had gone out, and when work was resumed, it had to be rekindled. When it was relighted, the blaze flashed up before any coal had been placed upon the wood. It was supposed that the wooden lining of the shaft caught from the blaze, although there were several feet of brick-work at the bottom. With a strong current of air, the flame immediately rushed up into the engine-room, setting fire to everything combustible in its way. The appearance of the fire, to one who could forget the peril of the men in the mine, was grand in the extreme. When it was at its height, the flames rose a hundred feet and higher. They were swayed by the wind, and could be seen now at an angle of forty-five degrees, and then almost perpendicular, while dense clouds of smoke rose and filled the air. As the day drew to its close, the excitement of the scene increased. For many miles up and down the beautiful valley the glare of a thousand lights was visible. The vast quantities of coal that had caught fire in the breaker were covered with sheets of colored flame, and occasional flashes added to the glare that lighted up the valley.

While preparations for entering the mine were in progress, hundreds of eyes were in tears, and the air was filled with the shrieks and sobs of those whose relatives and friends were below. As soon as the firemen could get to work, they began operations by sending a stream of water down the burning shaft in order to extinguish the fire; but for a long time the flames seemed to defy their efforts, and it soon became evident that the water supply was a very meagre one. It was also found very difficult for the firemen to work, as the location was upon a steep hill-side. In a few hours after the outbreak the shaft was completely choked up, for a distance of forty feet, with rubbish. Most of the day was taken up in endeavoring to clear away the *débris*, so that the engines might be used.

While all this preparatory work was going on, the throng of miners and workmen increased, and the hill was crowded with people. Meetings were organized for various purposes, and at one of them fifty experienced men were selected to enter the mine as soon as it was practicable to go there. Among these men three were owners and superintendents of adjacent mines; they volunteered their services, and were ready to die, if necessary, in the effort to rescue their fellow-miners, and subsequently some of them barely escaped death.

About half past five P. M., most of the timber and rubbish had been cleared away, and a dog and lamp were sent down the shaft to test the condition of the air. The cage was lowered as far as possible. When it came back the dog was alive, and the lamp was still burning. At half past six a man went down in a bucket, and returned in about seven minutes. He was able to breathe, but could not get beyond the obstructions. Soon after his return two men went down with tools, and, after clearing away the obstructions, they returned safely. While they were down they went through a gangway sixty or seventy yards, and came upon three dead mules lying near the stables. Then they came to a door which led into the mine, and, although they shouted and struck upon it repeatedly, they obtained no reply, and there were no indications that any of the imprisoned men were alive. Clouds of sulphurous gas were pouring out of the mine; so the men retreated.

Again another party descended to make explorations, but they were obliged to retreat, owing to the foul air and "black damp," and by the time they reached the top they were partially overcome. An engine was then rigged for the purpose of driving a fan at the mouth of the shaft, so as to force in air through a canvas hose, as the "choke damp" was found to be three or four feet deep at the bottom of the mine. One gang of men from the Scranton mines also suggested that an attempt should be made to drive a gangway from a neighboring mine into the Avondale; but it was found that it would take too long to cut through the solid rock, and the suggestion was not carried out.

After the engine had been put at work forcing air down e shaft, another party descended into the mine. They netrated through the gas about seventy-five feet, and ınd the large door leading into the mine open. They went : some distance farther, and in one of the passages found a ıall door closed. They reported that, had the door been en, there might have been some hopes for the men, as e gas, and fire, and smoke would have had a free passage ɔund the circuit and out again. Owing to the presence of arge quantity of gas and sulphur, the explorers had to re-e, and were more or less affected by it, one of the men be-ɡ overcome and almost insensible for some time after coming t of the mine.

After a consultation, a fresh party of volunteers were sent wn, and when they came back they stated that they had ade an important discovery. They said all efforts had been ade to extinguish the fire in the shaft and send in air, it be-g thought that the fire in the furnace had been drawn out ; the miners on the first alarm. It was found, however, ıat the furnace was full of coal and burning, and that a pile : coal had just caught fire and was blazing. Consequently ıe air sent down the shaft had not only swept over this fiery ırface, but must have carried the gas and smoke to the inner ɛcesses of the mine, and caused the death of every one of ıe unfortunates. A change of operations was to be consid-ɛd, and all hope of getting to the men that night was bandoned.

During the night efforts were made to extinguish the fire ı the furnace and beyond it, as nothing could be accomplished ntil this was done. A hose was let down the shaft, and four ıen descended. They were gone about twenty minutes ithout being heard from, and there was considerable anxiety ır their safety. At last they gave a signal, and were brought p. They could not fix the hose, owing to the foul air, but ported that the fire appeared to be dying out.

The next day another party went down, although those itside had given up all hope of seeing any of the miners

alive. On the return of the explorers, they reported the air to be less foul, and they had arranged the hose so as to throw the water against the roof at a great pressure, and allow it to fall on the furnace. Another visit was shortly made. The fire, though still burning, was much less, and the hose was hoisted so as to get at the flames. The heat at this time was very great, and the explorers were much fatigued, and had to be brought up, one of them being insensible.

On the next journey the fire had still decreased, and while the party were down the cracking of the roof of the tunnel was heard, and part of it fell from the effects of the cooling water. The noise of the falling roof was heard outside, and the party were loudly cheered as they came up the shaft safe.

Throughout the second day efforts were made to get at the bodies of the men, but this was found impossible until the fire and foul air could be controlled, as the men could not remain down the shaft for any length of time. At midnight of the second day a party went down to throw more water on the fire, and reported that in a few hours all would be safe for entering the mine.

At two o'clock on the third morning the atmosphere was found greatly improved, and the fire nearly extinguished. The party who went down this time succeeded in getting to the stables, and there came upon the first two bodies of those known to be below. When light was procured, the bodies were unrecognizable, their features being blackened and distorted. One body was evidently that of a middle-aged man, and the other of a young man about eighteen. The explorers were brought up the shaft, and made known their discovery.

At once preparations were made for sending down gangs of men, four in each gang, for the purpose of bringing up the dead as fast as they were found. At half past six A. M., four hours after the discovery of the bodies at the stables, a gang of men went down, and remained about half an hour. This proved the successful visit, so far as finding the bodies of the dead miners was concerned. Nearly the entire num-

of men were found to have fled to the east side of the
e. As this gang came up, and reported the finding of
bodies, another party went down, but were hindered in
ng at the bodies by a car packed around with coal, culm,
clothing, and when this was removed another obstruction
ared.

ıe man was found lying upon the outside, where he had
assisting to build the wall. The wall was completed,
a small aperture sufficient to admit a person. Appar-
the man had just finished his work, and was crawling
to his companions, when death overtook him. The
rity of the miners were found piled one upon another.

.e first body brought out caused great excitement among
whose relatives and friends were below. The counte-
e wore a placid look, and was not much disfigured. The
ye was partly open, and the arms and legs were slightly
ed.

ıe next body had both eyes open, and the head turned
. The next was that of a boy, who had gone down the
on the morning of the fire for the first time. Then
the body of a man who had evidently suffered extreme
v, judging from his countenance. His hands were firmly
hed, and in one he tightly grasped a pick. Another
appeared to have suffered great pain. Two boys had
ed their arms about this body, and the three proved to
ther and sons. Another man was found in a kneeling
ure, as if his dying moments were devoted to prayer.

me of the men in the fresh gangs lost their way on sev-
ccasions, and so a barrel of lime was sent down to make
ect path to what may be called the dead-house.

out four hundred yards from where the most of the
rs were discovered, a body was found by itself. It was
ıg upon the face, and had apparently been thrown upon
round. At a little distance was another body in a simi-
osition, and this, too, had been thrown to or had fallen
the ground.

less than two hours over sixty bodies had been taken

out of the mine. As they were brought up the grief was intense and heart-rending. Almost to the last moment wives, children, and relatives hoped against hope; but as the bodies were one by one sent up the shaft, the hopes died away. All around the sobs and moans of mothers and wives broke at intervals into piercing shrieks and wails of agony as the bodies were recognized. Many of the men were overcome with grief as they saw the remains of their comrades, and tears trickled down their cheeks from eyes unused to tears. Children too young to know their bereavement clung in mute astonishment to the sides of their weeping mothers, and shrank from the blackened corpses in which they were unable to recognize the fathers who kissed them farewell on the morning of the fatal day.

The men who brought out the bodies described the scene in the mine as best they could through their mingled grief and horror. Fathers and sons, they said, lay clasped in each other's arms. Some of the dead were kneeling; some were sitting hand in hand, as if they had vowed to live and die together; some lay on the ground, as if they had fallen while fleeing; and others lay as if pressing their faces into the earth in the hope of extracting from it a breath of pure air. Near the embankments were the picks and shovels that had been used to lay up the works that should exclude the foul air. In one chamber every man had stripped off his clothing to use it in stopping the crevices of the embankments, and one man was in the attitude of pushing his coat into a crevice. Apparently while he was so employed the foul gas rushed in and overcame him.

Most of the dead were buried on a knoll overlooking the Wyoming Valley. The funeral was attended by many hundreds of people, and was probably one of the most impressive funerals ever seen in the United States. Public subscriptions were opened in all parts of the country, and the people everywhere responded liberally to the appeal for aid. The legislature of Pennsylvania passed a law forbidding the exploitation of mines beyond a certain depth and capacity with but one

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shaft, and a similar law was enacted in other states. Never has public attention in America been so completely drawn towards a mining accident as in this instance. Good has come out of the terrible disaster, and it is to be earnestly hoped that more good will follow.

The terrible calamity at Avondale will be long remembered, not only in Pennsylvania, but throughout the United States. Every few months an accident at some one of the coal or other mines causes the interest in Avondale to be awakened; but happily there has been no accident at all approaching it in loss of life.

XXXIX.

IRON AND IRON MINES.

IRON AND ITS VALUE. — ITS ABUNDANCE, AND WHERE IT IS FOUND. — A MOUNTAIN OF IRON. — IRON MOUNTAIN AND PILOT KNOB. — THE AUTHOR'S VISIT. — CHASED BY GUERRILLAS. — A NARROW ESCAPE. — THE ANTIQUITY OF IRON. — ITS VALUE IN MANIPULATION. — IRON AS MONEY. — INCONVENIENCE OF USING IT. — FIRST IRON WORKS IN AMERICA. — DIFFERENCE BETWEEN IRON AND OTHER MINES. — DIRECT AND REVERSE WORKINGS. — A PICTURESQUE SCENE.

Of all the metals, iron is the most useful, and is found in great abundance in many parts of the globe. England, Sweden, and Russia are the most famous countries of the old world for the production of iron, and in the new world, North America has an inexhaustible supply. Along the Atlantic coast, from the New England States to the Carolinas and Georgia, there are numerous deposits of iron. On the west side of the Alleghanies there is an abundant supply. The great centre of the iron mines of that region is at Pittsburg. As we go farther west, we find most of the states are rich in this mineral, and in Missouri there is a mountain composed almost entirely of iron. The Iron Mountain of Missouri is of itself a great curiosity.

It is situated in Washington County, and is easily reached by railway from St. Louis. Properly speaking, it is not a mountain, but a hill. Its elevation above the valleys around it is less than four hundred feet. It is a low cone, with gently-sloping sides, and covered with a forest of oak trees. The soil where these trees grow consists of peroxide of iron, some of it being pulverized, and some of it in small lumps. On the sides of the mountain there are loose lumps of ore scat-

tered about, and before the workings began there were large masses of iron on and near the summit, some of them weighing many tons. Though the character of the mountain has been known for many years, no attempt was made to work this immense mass of ore until 1845.

A cutting was made in one side of the mountain, and the ore was found to be of excellent quality. In the valleys surrounding the mountain there is an abundance of ore, and for all practical purposes the iron mines of Missouri are inexhaustible. The ore contains nearly seventy per cent. of iron, though its yield, owing to the manner of working, rarely exceeds sixty per cent. About six miles south of Iron Mountain is Pilot Knob, which covers an area of three hundred and sixty acres, and is nearly six hundred feet high. It contains great quantities of iron, but is not as rich proportionally as the mountain which bears the name of the metal.

About two thirds the way up the side of Pilot Knob, there is one bed of ore about twenty feet thick, and estimated to cover more than fifty acres. Other mountains of the same character are in the vicinity, and all that is required to make the Missouri iron mines the best in the world is the discovery of a mountain or two of coal suitable for reducing the ore and refining the metal.

Iron is applied to a greater number of purposes, and consumed in larger quantities, than all other metals combined. There is no other metal which increases so much in value by the process of manipulation as this. A bar of iron worth five dollars is worth ten dollars when made into horse-shoes, fifty-five dollars when made into needles, four thousand dollars when made into penknife blades, and two hundred and fifty thousand dollars when made into balance springs of watches. In the form of wrought iron it is soft when heated. It can be hammered into any desired shape, rolled into plates, or drawn into fine wire. Plates can be rolled no thicker than a sheet of letter paper. The wires can be drawn so small as to be almost invisible to the naked eye. Combined with a certain quantity of carbon, it can be melted and cast into any

desired shape, and with another proportion of carbon, it takes the form of steel. As before stated, it enters in a thousand ways into our daily life, and if all the iron in the world were destroyed, mankind would suffer greatly.

The antiquity of iron is not exactly known, but it is supposed that the metal has been in use more than four thousand years. The catacombs of Thebes and the tombs around Memphis, some of them more than four thousand years old, represent butchers sharpening their knives on round bars of metal, and the color of the knife and metal indicates that they were of iron or steel. Homer has alluded to iron in the poems which have descended from him to us. History tells us that the Spartans were required to use this metal as money; probably it was more valuable at that day than now. If our money were made of iron it would be rather a serious matter for a man to carry cash enough about him to make himself comfortable for twenty-four hours. Imagine a New Yorker, starting on a journey where there were no banks, and he were required to carry a thousand dollars or so in coin. He would need a pair of horses to transport enough for buying his railway ticket to Washington, and for handling the loose change required on the road, he would need the assistance of half a dozen porters.

During the first seven centuries of the Christian era, the manufacture of iron attracted little attention. In the early part of the eighth century, mines were opened in the south of Europe, and from there, in the ninth and tenth centuries, the manufacture of iron spread northward. Improvements in the process of manufacture were steady, but slow. Small furnaces were made by which cast iron was produced, and after them came the invention of the blast furnace, which is said to have occurred about the middle of the sixteenth century. Other improvements were made in the following centuries, and in the eighteenth century a blast was forced into the furnace by means of a steam engine. Up to 1827 the blast was cold; but in that year a Scotch inventor patented a system by which hot air was thrown into the furnace, instead of cold.

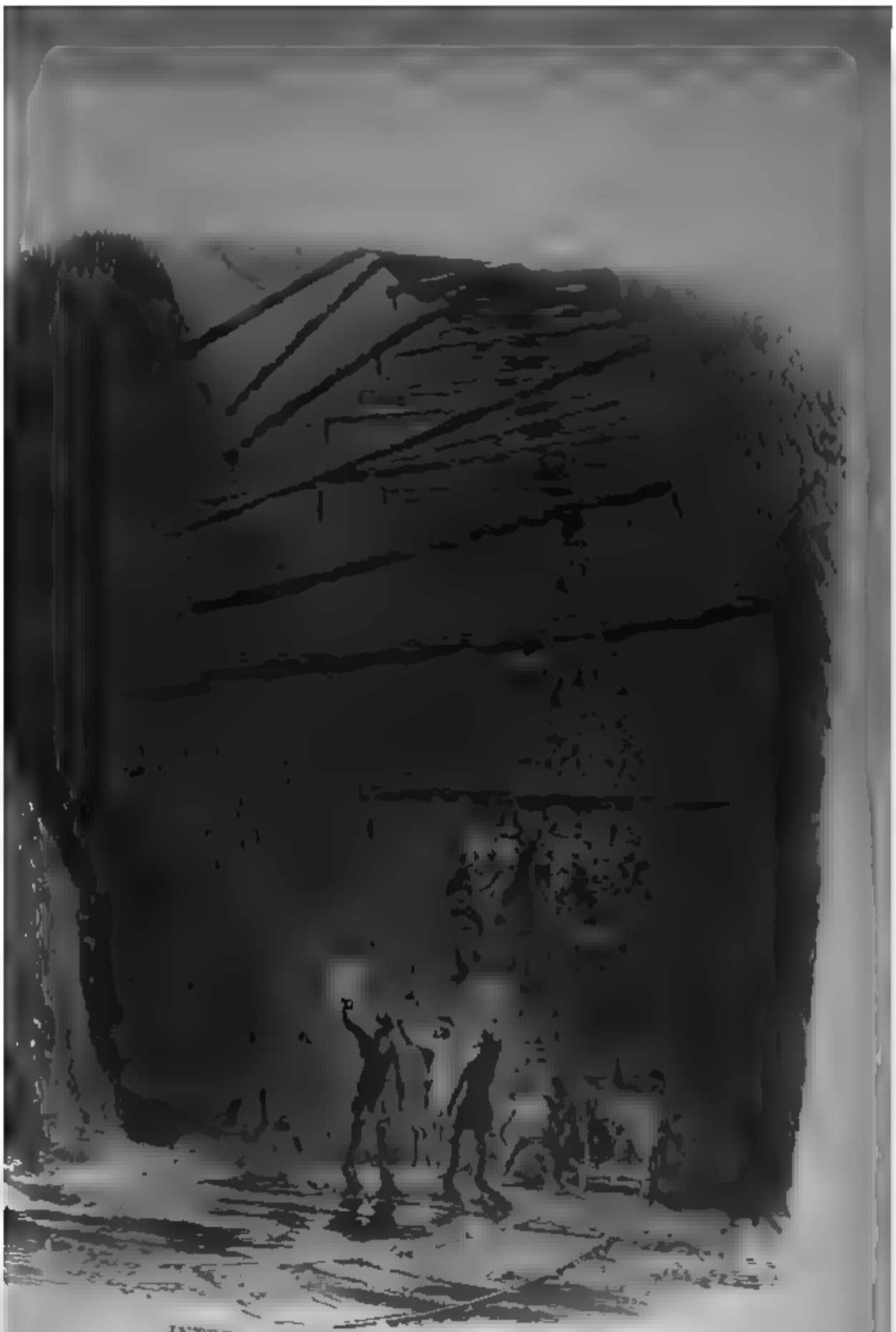
ation was regarded of so much importance that the
obtained damages of nearly a million of dollars from
company that had infringed upon his rights.
ining in America belongs almost entirely to the pre-
ury. The existence of the ore was known before that
t very little use was made of it. A History of Vir-
s that the settlers of that colony started an iron work
nks of the James River in the year 1622, but be-
thing was done, the people were killed by the Indians,
works were abandoned for more than a hundred years.
rges and furnaces were set up in various parts of
gland, one of them as early as 1702.
7 iron was exported from Pennsylvania to England;
w years later an act of Parliament prevented the
of rolling or splitting mills in the American colonies.
atest improvement in the manufacture of iron, in
, is in the use of anthracite coal. Previous to 1820,
s reduced by means of charcoal. About that year
ite coal was tried, and found to be available; and as
it came into general use the business of iron manu-
progressed rapidly.
working of an iron mine is very much like working a
f any other character. There are shafts, and tunnels,
els, just as in a coal mine. The ore must be raised,
men lowered and raised, just as in any other mine.
are, however, more open worked mines of iron than
, for the reason that the veins of iron are general-
d nearer the surface than the veins of the combus-
nineral. In the Iron Mountain of Missouri, which
eady been described, there is no necessity for shafts
els, for the reason that the mountain is a mass of ore,
only working necessary is to remove it in an open
, just as a bank of earth might be removed in making
ge for a railway.
only visit I ever made to the Iron Mountain and Pilot
region was during the war, when work at the blast
had been suspended. A small party of us climbed

to the summit of Pilot Knob, and it was not a great climb, after all. We found that the mine consisted entirely of open cuttings. The ore was drawn away from the cuttings by means of small cars, running upon a track. As the cuttings were partly up the side of the mountain, the loaded cars had a downward grade, so that no power was required to move them. Considered as mines with picturesque cuttings and underground scenes, they were a total failure.

We looked around among them, and found nothing which we could call sensational. While we were lamenting the absence of something interesting, a small party of guerrillas made their appearance in the valley below. They were armed, and we were not, and they were more numerous than ourselves. They moved straight in our direction, and we began to think that the place might be sensational, after all. We scattered among the oak trees, and disappeared as much as it was possible for us to disappear. The guerrillas evidently concluded that we were not worth attacking, — and they were entirely right in this conclusion, — for they changed their course, and rode away. We immediately abandoned our researches among the iron works, and returned to the railway station, which we considered a much safer place.

In many metallic mines the operations are not conducted exactly like those of coal mines, for the reason that the position of the veins and beds is frequently quite different. Some of the metal lodes are sometimes perpendicular, and generally have a high inclination to the horizon. In such cases, the system of working is by means of steps. Sometimes these steps are *direct*, or descending, and are made by attacking the ore from above. In other cases the steps are *reverse*, or ascending, and the ore is attacked from below. In either case the excavations are like steps of stairs. The direct system is not in use in coal mines, because the miner would be obliged to stand upon the coal which he had disengaged; but it is frequently adopted in obtaining metallic ores, which have to be pulverized and dressed to make them fit for the furnace.

Where the metallic ores are in very rich lodes, or thick



INTERIOR OF AN IRON MINE.

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ıey are worked by a system of large chambers, or excavations. In this system great chambers are under the earth and around the masses of valuable he copper mine of Lake Superior, and in some of la mines, this system is frequently employed, and the uncovering of a large mass will require con- time.

thods and apparatus used in the underground beds of coal are equally applicable to iron and all other e railway wagons and horses are the same in the lev- lleries of all kinds of mines. The workings are con- on the same principle; the ventilation is afforded by neans, and the surveys are accomplished in one case as in the other. The arrangements of the shafts are the same, and the buildings at the surface have a eness. There is, however, more animation usually l than about metal mines, for the reason that very mines furnish in the course of a month as much material as some coal mines do in a single day.

llic mines the work is generally harder than in coal d a great deal of blasting work is required. The mers, and other tools used are like those used else- nd sometimes the groups at work are very pic-

Imagine three men stripped to the waist, one of ling a drill and the others striking at alternate and tervals with large hammers. A single lamp burns a, and makes a curious effect of light and shade. piring skins of the men glisten beneath the rays, and ving their arms back and forth to wield the heavy they have an appearance not altogether human. A mining, when taken to the locality where these men rk, might easily be persuaded that he was looking of gnomes and wizards engaged in some diabolical

production of iron it is generally found less expen- nsport the ore to the coal than to transport the coal . Most of the ores are carried to points where coal

can be obtained at a cheap rate; and where coal mines and iron mines are found close together, the production of iron will be most profitable. For example, the ores that are obtained in Oneida County, New York, are transported to the anthracite regions of Pennsylvania, to be smelted in the great furnaces at Scranton, and the canal boats that carry the ore bring back coal for the furnaces near the mines. The reduction of iron ore is much more difficult, in most cases, than the work of obtaining the material from the earth. Sometimes the ore is of such a peculiar character that it will only yield to the hottest fires, and frequently the furnaces are run at considerable loss.

XL.

EXILES IN SIBERIA.

ILING IN A SIBERIAN MINE. — A DARING ESCAPE. — HOW IT WAS PLANNED. — TUNNELLING TO LIBERTY. — DISARMING GUARDS. — WORKING IN THE DARK AND WITHOUT FRESH AIR. — A MURDEROUS ATTEMPT. — CUSTOMS OF THE SIBERIAN PEASANTRY. — CARE FOR THE EXILE. — A SURPRISE. — A NARROW ESCAPE FROM DEATH. — LIVING IN A MOUNTAIN GLEN. — HUNTING IN THE ALTAI MOUNTAINS. — KILLED BY AN ARGAL. — SEPARATION AND DEPARTURE. — HOW TO OBTAIN PASSPORTS. — SAFE ARRIVAL AT HOME.

ONE of the mining regions of Siberia is in the valley the Yenesei River, and along some of its upper tributaries. ne Birusa River is one of these tributaries, and many an :ile has been sent there in times past, to work out the ntence allotted him. Most of the mines are known as sur- ce washings, like the gulch mines of California, but some the more extensive are conducted on the tunnelling prin- ple. Tunnels are driven into the hill-sides where it is ought gold can be found, and the earth is then brought out id washed in the river. In one of these mines some years go, there was a daring and successful attempt to escape, hich was described as below by one of the participants.

"Occasionally the earth in the tunnels used to fall, in con- equence of not being properly secured; but the quantity was rely very large, and the result was not serious except in two r three instances. We were driving a tunnel in one of the mall hills on the banks of the Birusa, and, as the soil was of loose character, the falls of earth were quite frequent. he men worked in gangs of ten or twelve, under the charge f an armed overseer: and as each man was in chains, and the outh of the tunnel was carefully guarded, there was no xpectation of an attempt at revolt. There were some crimi-

nals among us, but the most of the laborers were unfortunate Poles, who had been sent to Siberia because they wanted their own country to be free, and had endeavored to secure her freedom. I was among the latter, and had been more than a year in the mines when the incident I am about to relate occurred. Not a day had passed, during my imprisonment, when I was not meditating some plan of escape.

"At last I hit upon something which I considered feasible, and mentioned it to one of my companions. He agreed to it, and we gradually broached it to the rest of the men in our gang. Some of them hesitated at first, but they soon entered into it, and we made our arrangements.

"The hill was small, and I had discovered a sort of ravine or valley running along and into one side. I understood surveying pretty well, and calculated that the tunnel at one point was not more than twenty feet from this ravine. The prison where we were kept when not working was some distance from the hill, and the guards were so placed, that if we could get from the tunnel into this ravine, we could escape. My plan was to have a fall of earth in the tunnel near the entrance, and to dig a passage into the ravine while the dirt was being removed from the place where it had fallen. I took a lesson from ground squirrels and other burrowing animals, and intended to fill the tunnel with the dirt we removed, so as to keep our pursuers, or rather our rescuers, busy as long as possible. We managed to secrete an extra lot of candles, and also to conceal two days' supply of provisions. We then communicated our plans to the gang that relieved us at sunset, and they agreed to join us.

"On the evening fixed for our attempt, the relief gang was marched into the tunnel, and we were ordered to quit work. At a given signal we seized and disarmed our guards, and then bound them securely, putting gags in their mouths to prevent their giving any alarm. I then went to the place I had selected for the fall of earth, and pulled away the wooden supports. Down came the earth in such quantity as to block up the entrance, and cut us off completely from the outer

world. There we were enclosed in the tunnel, with many tons of gravel to be taken away before we could get out.

"We knew that we should soon be missed; in fact, it was more than probable that the guards at the mouth of the tunnel would hear the noise of the fall, and give the alarm at once. Of course it would be believed that the occurrence was purely accidental, and that we would set at work at our end of the heap to make our way out. I had carefully noted the spot where I intended to begin *my* tunnel, which should lead us to the open air, and to freedom.

"Part of the men began digging at the place I indicated; others carried the dirt, which was taken out, to the heap which formed our barricade. Two or three men were kept at the barricade making a great noise with pounding on the fallen timbers and pretending to shovel away the dirt. Our object in doing this was twofold; first, to drown the noise of our work on our new tunnel, and, secondly, to make it appear that we were as anxious to get out, and were as diligent in our efforts, as were those outside to help us. My calculations were, that we could get outside in about eight hours, as the earth was not very hard, and we were only making a narrow tunnel through which we could just pass by stooping.

"The men worked with a will, for life and liberty were at stake. We relieved each other every half hour, and never did men do more active service. The perspiration rolled from us in streams, for the air was hot and close, and I had not calculated in how short a time the confined atmosphere of our cavern would become foul with our breath, and with the heat of the candles. We extinguished all our lights except those where the men were employed, and those who could do nothing towards our enterprise sat in the gloom and were silent for the most part. We talked in low tones, through fear of being overheard by those who had been our guards, of our movements after we should escape from our confinement. Gradually the men ceased to speak, and some of them dropped their heads forward in sleep. As I had planned the escape, I was looked upon as the leader. I had

too much responsibility upon me to allow me to sleep. I felt drowsy, however, and seemed to be falling into a sort of stupor, like my comrades. I knew that my feelings and theirs were caused by the heavy atmosphere, and longed most anxiously to reach the open air.

"Eight hours had passed, and there were no signs of an end to our labors. The candles were burning dim, and threatened to go out speedily for want of oxygen to sustain them.

"Two of our number were criminals, and not, like the rest of us, political prisoners. One of the criminals proposed to kill our guards, so that they could give no information about us; but we refused to consider his proposition. He was a bloodthirsty wretch, who had been exiled for attempting to kill a companion while in a dispute over a glass of vodki. But he seemed so determined to murder the guards, that we concluded he might prove treacherous to us, and so we watched him closely. He tried by stealth to kill one of them, and I then thought he deserved no more forbearance from us. We bound him hand and foot, determining to take him with us a day or two, so that he could not give information about us, and then leave him to take care of himself.

"Just as the candles were flickering, and we were almost suffocated with the foul air, one of the men at work in the tunnel rushed from his place, and said, half shouting, and at the same time half whispering, —

"'We're through! We're through!'

"I went forward, and sure enough, there was a small aperture through which the dawning day was just visible. In a few moments the aperture was enlarged so that a man's body could pass to the outer air. The cool, clear atmosphere was refreshing in the extreme, and the shock of the change was so great that I almost fainted as I began to breathe freely. Day was breaking, and no time was to be lost. We could hear the men at work removing the fallen debris, and it was evident that they had not yet discovered our plans, or suspected that we were trying to escape. We had few prepara-

to make, and in five minutes after the opening had been ciently enlarged, we crept through it, and were out of our porary tomb.

We crouched close to the earth, as a part of the ravine was le from the prison, and there were fears that some of the ds might discover us. We left our chains where we had wn them off, in the tunnel, and fresh strength seemed to lded to our limbs, as we moved without restraint, and in- l no longer the hot air of our place of labor. The mur- r endangered us by rising to his feet, and standing at full h in an exposed part of our pathway. I was just behind and carried one of the guns wrested from our guards. I the scoundrel a punch with the bayonet, and quickly ght him to the ground. I threatened to kill him on the but he promised good behavior in the future, and I al- d him to live.

From the ravine we managed to get into a small forest, out, as we thought, being seen by any one. In the forest ould walk erect, but we had great fears of meeting some of the soldiers who belonged to the station, and might be to select wood for cutting. We pushed along, and luck- ncountered no one; and by the time the sun was up, we more than a mile from the place where we had dug our to freedom. We walked in silence, stopping now and to look around in all directions. We had nearly as much of meeting any one as we had of being pursued, since ncounter with a soldier or Cossack would give the alarm ir flight, and pursuit would then be a question of only a nours at farthest.

Two miles or more from the station, we reached the house peasant, or rather the edge of the clearing where he was ed. We dared not approach the house: but we knew we should find means to save the provisions we carried, ere was pretty sure to be a turnip-patch in its vicinity, e we could help ourselves. The Siberian peasants show t kindness to escaping exiles. They never speak of them xiles or prisoners, but as '*chasti ludi*' or 'unfortunates.'

Frequently they put loaves of bread outside their windows, in such position that they cannot be stolen by dogs, though easily taken by men. A hungry fugitive can thus help himself without fear of detection; and when the peasant rises in the morning, and finds the bread gone, he crosses himself devoutly, and breathes a prayer for the successful journey of the fugitive. 'God will help him,' he says, 'and speed him on to safety.' Frequently they plant patches of turnips at a little distance from their houses; and these turnip-patches are specially consecrated to feeding the unfortunates. And if no special field is set apart for his use, the exile knows that he can help himself to whatever vegetables will satisfy his hunger, and the owner will make no complaint.

"We found a small garden, where turnips and other vegetables were growing, and we did not hesitate to take what we wanted. A man came from the house, and I think he saw what was going on; but he pretended the most perfect indifference, and walked back again. Only two of us entered the garden; the rest remained in the edge of the forest, and waited for the two to gather what was needed for all. After taking a couple of turnips for each man, we moved away, and travelled in a westerly direction a little distance from the valley of the river. And now we began to debate about the best plan for our future action. How should we travel? Should we separate? And, if so, into how many parties? And what direction should we take? These were the questions that troubled us.

"The Siberians have a proverb, 'He who runs away has but one road; he who pursues has ten.' Several hours must elapse before our flight would be discovered, and when it was known, it would take some time to find where we had gone. But we were three thousand miles from Poland, and all except the two Russian criminals spoke Russian so poorly that we could not disguise ourselves effectually. All along this road there were military posts and soldiers, and in the towns we should be likely to pass there were the local police. Our number was so large that it would excite suspicion at the very

first station we passed; and the probabilities were, that if we kept together, and attempted to travel on the great road, we should all be retaken within three days. Plainly, this was not our proper course.

"We held a consultation, and each man was told to advance his views.

"One plan which was offered was, that we should keep together, and push southward into the Altai Mountains, trusting to subsist on fish caught from the streams, and on whatever game we could kill with our guns. The mountains are quite unsettled, and game is abundant; so that the plan was a good one, so far as existence went, provided we could make our ammunition hold out. But we had only ten charges for each gun, and these would soon be exhausted. We might set traps, and catch game in them; but this would involve delay, and render our progress very slow. South of the Altai Mountains we should be out of Russian territory, and among the wild Kirghese and Tartar tribes. Among these we could travel westward till we reached the Caspian Sea. Crossing that body of water, we should be in Circassia, and might have reasonable hopes, if we reached it in safety, of ultimately seeing our homes. But the way was long and dangerous; the Tartars are treacherous, and might convert us into slaves, or sell us back into Russian hands. After a brief debate it was decided not to adopt this course.

"Another plan was to break into parties of two or four, and attempt to travel by night, while lying concealed during the day. We had almost resolved upon this, when I thought of a feasible scheme, which I proposed. It met a ready concurrence, and was at once adopted.

"'All roads will be watched,' I said; 'and if we break into parties, and move on at once, some of us will be caught. Let us move south into the mountains, and find a place where we can pass the winter. We can trap game enough for our winter support, and can make a tolerable shelter by piling up stones, and roofing them over with trees. We will keep together till spring, and can find a secluded place where we

shall not be liable to be discovered. We have no passports, and cannot travel without them; and my scheme includes an arrangement for getting them. In the spring we will leave our hiding-place, and break up into parties of three. Our beards will have grown out by that time, so that we shall not be recognized as prisoners, and our hair will be long enough to cut in the Russian style. Then we can go to the private mines, and hire out as laborers during the summer, and by the end of summer we shall be able to travel without much fear of detection. We can pretend to having lost our passports, and the certificate of our discharge from the mine where we were employed will be sufficient for us until we get out of the province. After that we can get along somehow; at all events we can stay a couple of years in the mines, and then obtain papers that will carry us in comparative safety where we want to go. It may take us two or three years to reach Poland, but we shall certainly be better off than by running the risk of recapture.'

"When our plan was settled, we all knelt and prayed for success. We observed the direction of the sun, and travelled towards the south, keeping well away from the river valley, where we could see the only settlements which the region contains. We made good speed that day, and halted at night in a little glen surrounded by high rocks, and affording an excellent place for concealment. From a small stream near by we caught a few fish, and as each man had carefully preserved the provisions brought from the station, and eaten nothing but the two turnips obtained in the morning, we had no immediate fear of starvation.

"Early in the morning we continued our journey. No incident of importance occurred during the day, and at night we halted in a place much like the one where we had last slept.

"On the third day we saw mountains in the distance, and knew that they were some of the peaks of the outlying chain of the Altai range; but they were a long distance away, and seemed to recede as we approached them. We pressed for-

ward as fast as possible, though some of us were in danger of falling through exhaustion. Our feet were sore, as we had long been unused to travel, and on the fourth night we concluded to rest a day or two to gather strength. We dared not light a fire through fear of discovery, and so we passed the cool hours between sunset and sunrise closely huddled together, and shivering till our teeth chattered with pain. We made rude beds of boughs, and slept on them as best we could; but our sufferings were so severe that we shuddered at thought of the winter that was coming, and more than once several of us wished we were back again in prison. The day of our halt was passed in sleep, two of our number being kept at watch, to warn us of the approach of any one who might discover us.

"Towards evening a man was seen approaching our retreat. The murderer convict, whom I will call Egar, was on the watch at the time, and with him was one of my compatriots. A low whistle from Egar warned us, and we all sprang to our feet. I hoped the man would pass without seeing us, and consequently we would not have occasion to harm him; but fate willed it otherwise. He came directly towards our retreat: had he stopped, and turned back, when within twenty feet, he might have escaped, as we stood among the rocks in such a way that only a near view would reveal us. As he passed the spot were Egar was crouching behind a rock, the latter sprang forward and seized the stranger by the throat. There was a struggle, in which both fell, and we rushed to the assistance of our companion. Egar seized a stone, and was about crushing the head of his antagonist, when the other watchman seized his arm.

"'Let me kill him: let me kill him,' screamed Egar.

"The other held him, and in a moment all of us were at his side.

"'No blood; no blood,' was our united demand: 'or, at least,' said I, 'let us do no murder. If the man must die for having found us, let us give him a little time for preparation.'

"We released the stranger from the hands of Egar, and

assisted him to his feet. He was half stunned, and I saw that he was greatly frightened, as indeed he had reason to be.

"'I give myself up,' he said, as soon as he could speak.

"'Where are you from?' I asked.

"'From the Petrovsky mine,' he replied.

"'When did you leave it?'

"'Three weeks ago.'

"'Where have you been during that time?'

"'Hiding in the forest, and among the rocks; but take me back, and I will not resist.'

"'Well, come along,' I said, in a tone of authority; and we led him to the place we had just left.

"Two of us held the muskets over our prisoner, while I questioned him closely, and found that he was, like ourselves, escaping from captivity. When fully satisfied of the truth of his story, I nodded to my companions, and told him our true character.

"He opened his eyes in astonishment, and then fell on his knees, to thank Heaven that he was yet free. Of course he was added to our party, though Egar urged that it was the safest plan to put him to death, and thus prevent the possibility of his escaping and giving information of our movements.

"But all the rest were opposed to such a bloody deed, as we shrunk from killing a fellow-being, and besides, were satisfied that the man told the truth.

"In the morning we changed our position to a more secluded spot, as we naturally thought there was danger that others might wander in the same direction as the new comer. We rested the entire day, and were sufficiently recovered to push on. Just as we were about starting, our lookout saw, in the early light, a couple of horsemen riding up the valley. They were followed by two other horsemen at a short distance, and we naturally concluded that they were pursuing us. So we remained concealed, and, four or five hours later, we saw the men returning, as if they had abandoned the search. I say, we saw them, but, in fact, only one of our number did so, as the rest lay concealed among the rocks. As soon as they

out of sight, we moved forward, and made a good day's
ress, notwithstanding the loss of the morning hours.
Ve were in a wild country, where settlements were few,
none of them extended beyond the valley of the river.
lared not approach any of these for fear of giving indica-
of our whereabouts; we could trust the peasants in most
nces, but of course there might be, now and then, one
would betray us. Some of the settlers in this region are
acks, and these have not usually any sympathy with the
s, but would capture or kill them with little compunc-
'Shoot a rabbit, and you get his skin,' says a Cossack
erb; 'but shoot a *varnak* (vagabond), and you get skin,
se, and overcoat.'
Ve lived upon fish from the small streams, upon edible
which we found occasionally, and upon the remnants of
provisions brought from the mine. We resorted, in a few
nces, to theft, at the suggestion of Egar and the man he
aptured. A strange sort of friendship sprang up between
, and they went together on several enterprises for our
non support. At night they would descend to a farm,
never one was within reach, and would generally manage
ring away a lamb or pig, which would be immediately
l and cooked. We made fires at night only, and always
ch a way that the light was not visible for any distance;
this mode of supply was precarious, and whenever we
ned anything by it we were careful to preserve our pro-
ns as long as possible.
Among the outlying hills of the Altai we left the settle-
s altogether, and depended entirely upon our own re-
ces. Now and then there were villages or encampments
e Tartar inhabitants of the region, but we avoided them
ether, though occasionally stealing a sheep from them.
e Tartars have large flocks of sheep, and are not very
hful of them; so that a theft was comparatively easy, with
exception of the danger of discovery by the dogs, which
lways kept around an encampment. Several times Egar
ned empty-handed from his expedition, and severely

anathematized the dogs for interfering with what he considered a legitimate pursuit.

"With many hardships, but with no adventures of importance, we reached a sheltered place in the mountains, where we thought we would be safe from pursuit, and established ourselves for the winter. We found a glen containing a grove of larches and firs, and on three sides the rocks were precipitous and overhanging. The entrance was narrow, and could be easily defended, and in one place there was an opening in the rocks which we could easily roof over to form a house. The glen was full of hares and other small animals; Egar and his new friend were skilful in constructing traps, and we at once set at work to lay in a supply of food. Egar, in one of his expeditions in search of sheep, had stolen an axe, which proved of great service to us in many ways. We made a comfortable shelter, where we could live; our beds were of boughs cut from the trees, and we soon gathered a sufficient quantity of skins from the animals we caught to make a good supply of coverlets and winter clothing. We desired to save our ordinary clothing for future use. The suits we wore in prison were the common garments of the peasantry, and the only mark to indicate our character was a number sewed upon the right shoulder. This we had carefully removed, so that we could readily pass for peasants.

"The winter came on, and proved of unusual mildness. The snows were light, and we were well sheltered, so that we did not suffer. We trapped game, and hunted occasionally among the hills, but were very careful of our ammunition, so that we relied almost entirely upon our traps. On several occasions we ran down the *argal*, or mountain sheep, and frightened them into attempting to jump a ravine too wide for their strength. They fell upon the rocks, and were killed by the force of the fall. But we found this mode of hunting very dangerous, and once it resulted fatally. Serge Ponitsky, one of my countrymen, was pursuing an argal over the rocks, and half a dozen others of our party were shouting to the animal in order that he might keep in the desired direction. Serge

)se upon the argal, and in his excitement did not ob-
hat he was near the edge of a high cliff. Suddenly
ute stopped, and wheeled around. Serge waved his
make him continue in the way he ought to go, but he
de up his mind not to keep on. Serge then seized him
horns, — not thinking of the great strength of the
, — and the two struggled for a few moments; in their
les they went near the edge of the precipice, and sud-
rolled over it.

e scrambled to the foot of the cliff as soon as possible,
arts full of fear for the result. We found the argal
nd Serge lying upon him. Both his legs were broken,
l of his ribs were crushed, and as I bent over and took
nd, I heard him faintly pronounce the words 'home'
oland.' He then became unconscious, and five minutes
e was dead.

e buried him near our camping-place, covering the grave
eavy stones, and erecting a cross above it. The event
gloom over our party, and for several days no one
o venture into the mountains. After this accident we
nore cautious, and nothing of a serious nature occurred
the rest of the winter.

the spring we divided into twos and threes, as previ-
rranged, and left our camp. We drew lots to settle the
of departure, as it was arranged that the divisions
start at least two days apart, so that there would be
isk of their encountering each other, and attracting
on by their numbers. Our parting was tearful, as we
en endeared to each other by our mutual experience of
nd it was certain that we should never again be united.
fell to the third division, and though I live a thousand
I shall never forget the morning when I embraced
was leaving behind me, and set out to encounter dan-
hat I could not foresee. Silently with my two com-
s I left the camp, and for more than two hours neither
ould utter a word.

e travelled on and on to the settlements on the Yenesei,

subsisting as we had subsisted at the time of our escape. At one of the private mines we obtained work during the summer; laborers were scarce, and the proprietors were quite willing to engage us without asking any questions that might annoy us.

"At the end of the summer we were paid off. A few days before our payment we managed to drop some worthless papers into a fire where several men, among them one of the superintendents, could see us. We pretended to be in great distress, that the papers were our passports, and that we had nothing else for our protection. The chief of the mine consequently made certificates to the loss of our papers by accident, and the certificates were sufficient for our protection. During the winter and early spring, we managed to travel to the Ural Mountains, where we again hired out for the summer. In this way we obtained money enough to take us to Poland, where we arrived three years after the date of our escape.

"What became of the rest of our party I have never positively known. Two of them have reached Poland, as I am informed; and I have heard vague rumors that some of the others were captured, and returned to the servitude from which they had escaped. But no direct tidings from any of them have ever reached me."

XLI.

LEAD MINES OF IOWA.

FFS AT DUBUQUE, IOWA. — THE LEAD MINES. — HOW LEAD IS FOUND THERE. — INDIAN DISCOVERIES. — HOW THE SECRET BECAME KNOWN. — STORY OF HE SIX INDIANS. — FOLLOWING THEIR TRACKS. — AN INDIAN TRAITOR. — N EXPLORER'S ADVENTURE. — THE INDIAN GUIDE AND THE GREAT SPIRIT. — URDER OF TWO EXPLORERS. — USES OF ABANDONED SHAFTS AND CAVES. — N EDITOR'S DISCOVERY. — AN UNDERGROUND BANQUET. — UPS AND DOWNS F A LEAD MINER. — DEATH OR A FORTUNE. — A DANGEROUS BLOW. — A INUTE OF GREAT PERIL.

)N the Upper Mississippi, in the vicinity of Dubuque, Iowa, re are many lead mines, and in the vicinity of these mines bluffs contain numerous caverns, rarely of great extent. netimes these caverns are in the form of a succession of mbers extending and opening into one another; and in se chambers rich deposits of ore are found. Several years the author visited Dubuque and the region around it, and s kindly escorted by one of the citizens, Mr. Henry W. tit, in an examination of the natural and artificial curiosi- s of the place. We had a wearying tramp, and returned to hotel covered with dust, accumulated in our inspection of fts, tunnels, caves, and other underground works of nature art. I was under the impression that if we had been re- ced in a furnace, a fair amount of lead could have been ob- ned by the reducer; and lest some enterprising resident uld make an effort in that direction, we washed off the ac- mulation as speedily as possible.

The lead mines of Dubuque were discovered and opened on after the settlement of the place by Julien Dubuque, er whom the city was named. The Indians were aware the existence of the rich mineral, and the first information out it was obtained from one of the red-skinned gentlemen

who had partaken rather freely of the white man's fire-water. They used to bring lead to sell to the whites; they revealed some of the localities whence they obtained it, and then their white neighbors went to work to dig for themselves. But there was one deposit, supposed to be the richest of all, that the Indians would never reveal, if the story was told to me correctly. There were half a dozen Indians who used to appear and disappear mysteriously; whenever they wanted money or goods, they would go away a few days, and return with all the lead they could carry. All efforts to induce them to tell where they obtained it were of no avail. The experiment was tried repeatedly of getting them drunk, but the more they got drunk, the more uncommunicative they became. They were promised that if they would show the rich deposit, they should never again be required to draw a sober breath as long as they lived; but even this glittering bait did not allure. Wealth, fame, and perpetual intoxication could have been theirs, but they preferred to bask in the sunshine of the smiles of the Great Spirit, who would be unpardoningly angry if they told their secret to the white man.

A watch was set upon their movements; but an Indian is proverbially a troublesome customer to the detective who tries to follow him, and the spies on the track of these aborigines invariably came to grief. Finally, one of the pale-faces pressed his arguments so far as to induce an Indian to agree to turn traitor to his brethren, and reveal the locality of the lead mine. Comfortably soaked with whiskey, the twain started, with provisions for several days' journey. The Indian led the way to a secluded spot among the hills, miles away from any human habitation. All around in this little valley there were the remains of fires where the Indians had melted out the lead from the ore; it was so rich that a common wood fire in the open air was quite sufficient for its reduction.

But suddenly the Indian stopped, and looked anxiously into the sky. After gazing there a full minute, he turned to his companion, and refused to show him further.

"Go on, go on!" said the impatient explorer.

o; not go on," replied the Indian. "Great Spirit angry . him looking now."

e explorer looked, but could see no spirit beyond that he carried in his bottle. He offered some of it to the n, in the hope of overcoming his terror.

t it was "no go" with the red man. He took the pro t drank, and then looked again into the sky. Evidently w, or fancied he saw, the Great Spirit frowning upon for he turned on his heel, and ran faster than he had ever known to run before.

e explorer was left alone, and concluded to investigate on account. There were the remains of the fires the lead had been melted, and the number of them ed that a goodly amount of smelting had been done there. mine must be near, and of course it ought to be easily . He looked for a path which might lead to it, and here ound that the Indians' cunning had baffled him. In no tion was there any track, and it was evident that the In- had made it a rule never to follow the same course when entering or leaving the valley. They had brought ore from somewhere, but there was no way of knowing ther that place was feet, yards, or miles away.

e spent a couple of days in a careful examination of the ity, but found nothing, and returned home very little r than he went out. He had a suspicion that he was hed from the time the Indian left him until he gave up search, but could not say positively that such was the . A few days after his return, the Indian made his ap- nce with a fresh lot of lead, for which he refused all pensation, though he did not decline to get drunk at the ense of his acquaintance. He would not talk freely, but nly declined to go on another expedition, and, further- , cautioned the white man not to undertake it.

e latter would not be advised; and, two or three weeks he set out with a friend, with the intention of spending ek or two in exploring the region around the Indian ting-place.

They were absent one, two, three weeks, and finally their friends became alarmed for their safety, and started out to look for them. Their search was unrewarded, as no trace of the missing men could be found anywhere. No Indians were seen. The half-dozen came and went as usual, but to all questions they returned the most unsatisfactory and non-committal answers.

One day a hunter found the remains of the two men. Wild beasts had devoured the bodies, but their weapons and scraps of clothing remained, and sufficed for their identification. In each skull there was a deep indentation, caused, undoubtedly, by a tomahawk in the hands of an Indian. But further than this the circumstances of their deaths were never known. After the discovery of the bodies, the Indians did not visit the settlement as often as before, and it was universally supposed that they committed the murder, or, at all events, knew to whom it should have been attributed.

Years afterwards a rich vein of lead ore was found two or three miles from the valley to which the Indian led the first explorer. There was a small cave, so carefully concealed by brushwood that it was only revealed by accident. There were indications that it had been visited by Indians, and that quantities of the ore had been carried away. All around the sides and roof of the cavern there were blocks of rich ore, and the discoverers made a comfortable fortune out of the deposit. It was supposed to be the cave whence the Indians obtained their supply, but whether so or not was never positively known.

In the bluff at Dubuque, lead mining was carried on in two ways — first, by entering the caverns and veins from the foot of the bluff; and, secondly, by sinking shafts from the surface. The shafts were not very deep, so that no elaborate machinery was required for hoisting purposes, a common windlass or a whim, worked by horse power, being all that was required. Where the mining was pushed from the foot of the bluff, levels were driven in until a cavern or seam was reached, and very often the seams in the bluff were taken as the starting-point.

The lead was not found in continuous veins, like coal and iron, but in separate masses, that had little connection with each other, though frequently the chambers or caves communicated. Consequently a mine might be soon exhausted, and then the shaft or level would be abandoned, as it was no longer lucrative. The hills back of Dubuque, at the time of my visit, were full of abandoned shafts, and it was dangerous to walk there at night, as many of the shafts were entirely unprotected by fences or railings. Several accidents have occurred by persons falling into these shafts; and I was told that on one occasion two lovers, who were taking an afternoon promenade there, walked into a shaft, and were killed by the fall.

While the business of Dubuque was in the height of its prosperity, about 1857, some enterprising men constructed a shot tower on the low ground near the Mississippi River. It is well known that shot for ordinary hunting purposes is made by pouring melted lead through a sieve, where it can have a fall of a hundred feet or more. In falling it assumes a spherical shape, and at the same time is cooled and hardened. To save it from injury it is received in a tank of water. Afterwards it is polished and brightened by being rolled in plumbago and certain other substances, and is then ready for the bags in which it is offered for sale in the sporting stores.

Now, the shot tower costs considerable money, and in order to be profitable, the work of making shot must pay the interest of the cost of the tower, besides the wages of everybody concerned. The editor of a newspaper at Dubuque was one day rambling among the abandoned shafts back of the town, and endeavoring to hit upon some plan for making them once more useful.

Suddenly an idea occurred to him, and he hastened to lay it before a friend who was interested in the shot tower.

"Here is my idea," said the editor. "The melted lead must fall from a certain height, and you have spent fifteen thousand dollars to build a tower to give that height to the dropping lead. Now, it makes no difference where the fall is; and why could you not get it in one of these abandoned shafts,

which would cost nothing? And besides, you save the expense of hoisting the lead to the top of the tower. I can start a shot company that will undersell you in spite of all you could do."

The tower man stood a full minute in a brown study. When he had collected his thoughts, he said, —

"I think you are right, and wonder nobody ever thought of it before. But don't say a word about it for the present. The St. Louis Shot Company is now negotiating for our tower; it wants to have a monopoly of all the shot business on the river, and we shall sell out. When we have sold out, and have the money in our hands, you can start your theory, and anybody that wants to try it can do so. If you say anything now, you may spoil the whole arrangement."

The editor promised to wait, and kept his promise. The Dubuque tower was bought by the St. Louis Company, which congratulated itself on having a monopoly of the shot business at Dubuque. But very soon the editor advanced his theory; somebody put it in practice, and found it was entirely correct. Abandoned shafts were occupied by shot-makers, and found to answer the purpose exactly, and the business of the tower came to an end. "Why did not somebody think of this before?" is a question that is often asked whenever a new and simple invention is brought to the attention of the public.

When the mines were operated at the base of the cliff by means of levels, and the chambers were stripped of their lead ore, the owners found themselves in possession of magnificent cellars, that could be used for storage purposes. As time rolled on, and Dubuque grew into importance, many Germans went there to live. The German is fond of beer, and wherever you find Germans in goodly numbers, there you will find the care-dispelling lager and the appetizing pretzel. Breweries rose and flourished at Dubuque, and the fame of the beer that flowed from them extended even to the mouth of the Mississippi. The abandoned caves of the lead workers were well suited to the wants of the brewers, as they made excellent cellars for storing the beer between the time of its manufac-

ture and of its sale. They were of an even temperature throughout the year, and the temperature was exactly suited to the Teutonic beverage.

On several occasions the brewers gave entertainments in their cellars, and set the tables for their guests between the rows of beer casks. The guests were converted into casks of beer by the time the entertainments ended, and occasionally they needed assistance to find their way out to the open air. There is a novelty about an underground banquet, especially when you find your legs giving way beneath your weight, and you are led to believe that the earth above will come down at an inopportune moment, and crush you as flat as a sheet of paper, without giving you time to send word to your friends.

In our rambles about the bluffs, Mr. Pettit told me of an adventurous inhabitant of Dubuque who used to alternate regularly between wealth and poverty every few months. He was a lead miner, who spent most of his time in discovering fresh deposits of the valuable ore. When he found a deposit, he was rich, and lived at a rapid rate until the money obtained from it was gone. Then, without a dollar to call his own, and frequently burdened with debts he could not pay, he would shoulder his pick and start on a tour among the hills, where he hoped to find the material with which his fortune could be restored. Sometimes he would hunt for weeks without finding anything; and just as he had determined to abandon the search, and hire out as a laborer, he would find what he wanted. One of his adventures was narrated to me in his own words, which I will give as nearly as I can remember them.

"Once I was dead broke," said he, "and owed a good deal of money. My creditors were pressing, but they knew I hadn't the first cent to pay with, and so they didn't press very hard. I hunted around a long time, but not a bit of ore could I find, and I seriously thought of going to the river and making cat-fish bait of myself, so as to get out of my misery.

"One day I got in among the chambers in the bluffs, and in one of them I found a small hole, which I thought might possi-

bly lead to something rich. I enlarged it, and got through into a new chamber where there were blocks of lead; and then I knew there was more of it close by. These chambers often lie one above another, and there was evidently one just above where I stood. A blow or two of my pick in the ceiling above would open it, and when it was opened, there was a fortune ready for me.

"Well, no, it wasn't a sure fortune. This business has its drawbacks, and sometimes there is a serious drawback in a place like that. Most of these chambers are dry, but now and then they are full of water, and sometimes you will find a dry chamber under one that is full. There I stood, wondering what to do. I was never more puzzled in my life.

"The hole where I entered was small and long. It was a hard place to get through, and it took time. The place was low; in fact, I couldn't stand erect without butting my head. If I tapped the ceiling, and the chamber above was full of water, I should be drowned like a rat in a cage. One blow would loosen the whole bottom, and the water would come down like Niagara.

"If I went out and tried to enlarge the entrance before tapping the ceiling, some other fellow might get in there and take possession. If he opened the chamber before I did, he would be the owner, and I could not lay any claim on account of discovery.

"I thought it all over. I thought of my poverty and the fortune that lay before me. I thought of the chance of death if the cave was full of water. I threw down my pick, and almost determined to go away, and not take the risk. Then I looked at my ragged clothes, and remembered that they were all I had, and that I hadn't money enough to buy a breakfast. Then I stooped and grasped the pick, and took a firm hold of the handle.

"'Here goes,' I said, 'for one thing or the other.' I set my teeth, swung the pick, and tapped the ceiling above me.

"The water came down; I dropped to the floor, and felt that I was lost. I must have fainted, for the next thing I re-

member, my candle, which was only half burned when I struck the blow, was nearly consumed, and I was lying there soaked in a small pool that surrounded me.

"I rose, rubbed my eyes, and looked around, and then I saw how it was. There had been a few buckets of water in the chamber above, where there might have been hogsheads. I was alive and safe, and the chamber was opened.

"I lighted another candle, and went to work enlarging the hole I had made. In a little while I was able to climb through it; and there, all around me, lay blocks of rich ore; and I felt that I was no longer the poor vagabond I had been a few hours before. But I don't think I would go through that excitement again for all the lead mines that ever were known."

XLII.

MINING IN THE BLACK HILLS. THE WONDERFUL MINE UNDER LAKE SUPERIOR.

FIRST REPORTS OF GOLD IN THE BLACK HILLS—DISCOVERY OF PLACER DEPOSITS—THEIR EXTENT AND RICHNESS—DEADWOOD AND RAPID CREEK—SAD FATE OF AN EARLY EXPLORING PARTY—VALUABLE QUARTZ VEINS—MODE OF REACHING THE COUNTRY—OTHER RESOURCES OF THE BLACK HILLS REGION—BRILLIANT PROSPECTS FOR THE FUTURE—A REMARKABLE MINE UNDER LAKE SUPERIOR—CURIOSITIES OF SILVER ISLET—WORKING UNDER DIFFICULTIES—ORES OF UNEXAMPLED RICHNESS—MINING ADVENTURES UNDER THE LAKE—NEW ROUTE TO THE CENTER OF THE EARTH.

When the frontier newspapers first began publishing their exciting reports of rich gold discoveries in the Black Hills, some of their editors doubted its existence there in paying quantities. Gen. Custer had reported gold discoveries, but the scientific gentlemen accompanying his expedition had denied finding it in deposits of a remunerating richness. Doubt and uncertainty shadowed the prospect uutil the development of the rich claims of Deadwood and Whitewood gulches, and the encouraging indications found on Rapid Spring and French Creek, in the spring of 1876. But the richness and extent of the Black Hills gold mines may now be considered demonstrated. A great deal of money has already been realized from them, and as yet they have not been even thoroughly prospected. The fact that the Black Hills had so long been unexplored and unsettled by white men is not altogether attributable, as has been popularly supposed, to the strength and hostility of the Sioux Indians, who roamed over, and are still dangerously powerful to the west of that region. The principal reasons are that they were not immediately on the moving lines of transcontinental emigration, and that the country had no defi-

nite knowledge of their wealth in soil and mine, while the natural resources of other sections of the far West were advertised far and wide. That the Black Hills have been taken possession of by white men in the face of both government opposition and Indian hostilities, proves the correctness of this assumption.

Gold was discovered there by white men years before the lamented Custer entered the country at the head of an army. And it would undoubtedly have been settled and developed immediately after, had not these unknown first discoverers all been massacred by Indians, and therefore the reports of their discoveries were never published. Near Rapid Creek, and on Whitewood and Deadwood Creeks, old "prospect holes" have been found. There is an old shaft on a gold-bearing quartz vein which crosses Deadwood Gulch, and the trees near by bear the marks of bullets and arrows, whose appearance proves that they were made years ago. In one of the Deadwood claims old rusty nails were found, and on another there was an old pile of tailings. Of the conclusion arrived at from these evidences there can be no reasonable doubt: the unfortunate white men who sank the shaft on the gold vein were seized and tied to the missile-scarred trees and riddled with arrows and bullets. Those who excavated the old "prospect holes" likewise fell victims to the Sioux, and not one of these first discoverers was left to report the fate of the others.

The Black Hills are an isolated mass of elevations, about 120 miles in extent from northwest to southwest, with an average width of 50 miles: their area being not less than 6,000 square miles. They are so called from the somber aspect they present from a distant view, caused by the vast evergreen forests of pine with which they are generally clothed. According to the latitudinal lines they are about 60 miles north and a little over 800 miles west of the city of Chicago, and are situated between the two forks of the Cheyenne river, which surround them so completely that both these streams have their origin in the same locality, and their headwaters interlock. The north current is usually called the Belle Fourche, or beautiful Fork

The Hills are reached by railroad to Sioux City and Yankton, or to Bismarck, on the upper Missouri, or to Cheyenne and other towns on the Union Pacific. They embrace all that is grand and beautiful in nature—cloud-piercing peaks, snow-crowned nine months out of the twelve; deep down canons, gloomy and savage, with dense forests and craggy walls of slate, granite, or limestone; fairy fountains and crystal streams, and richly flowered plateaus and glades.

The highest peaks are from 5,600 to 8,000 feet high; not so great altitudes as are found among the perpetually snow-capped mountains of the Big Horn further west, but they appear as lofty when measured by the eye in comparison with the surrounding elevations.

As soon as the Custer expedition of 1874, which gave to the world its first authentic knowledge of the existence of gold in the Black Hills, had returned to Fort Lincoln, a party of adventurers organized at Sioux City and went thither. It consisted of twenty-eight men and one woman. They camped on French Creek, in the southern part of the Hills, where Custer City now stands, and erected stockades. They found encouraging gold prospects, but were soon forced to return from lack of supplies. The "gold fever" continued to spread, however, and soon got under such headway all along the frontiers that government opposition was of little avail. Hundreds flocked to the new El Dorado, their objective point being the stockades on the French Creek. In the spring of 1875 these pioneers organized themselves into a town company, and the site of Custer City was staked off into building lots, being at first christened Stonewall. The number rapidly increased, so that by the last of December, 1875, a provisional government was organized, and a few laws, simple in form, but comprehensive in their scope, were adopted, their execution being entrusted to a marshal and justice of the peace. Emigration continued to increase, the new comers first satisfying themselves that gold really existed on French Creek, and next securing a town lot and erecting a building thereon.

Soon a house of some kind was constructed on nearly all the

lots contained in the town site of 640 acres, the hopeful owners believing they had a San Francisco in embryo. Notwithstanding that danger from hostile Indians existed everywhere, even in the very suburbs of the town, prospectors pushed their enterprise in all directions, and soon the auriferous deposits of Spring and Rapid Creeks, to the northward, were covered with miners' claims and embraced in mining districts. During the winter of 1875–6, Deadwood and Whitewood gulches were reached 70 miles north of Custer City, and were also claimed throughout their extent.

One claim in the former, No. 1 below discovery, was offered in February of 1876, for a sack of flour and corresponding amount of bacon, and a few months later had produced gold to the amount of $250,000. The number of mines in the Hills on the first of July, 1876, was estimated at 6,500, about half of which were settled in and about Deadwood City. Crook City, 10 miles below Deadwood, at the mouth of Whitewood, contained about 500 inhabitants; Hill City, on Spring Creek, had 150 houses and less than a score of inhabitants; and the mountains were pretty generally filled with prospectors.

An old placer miner, upon his first view of French Creek, would shrug his shoulders and say, "This don't suit me." The creek has a low, sluggish flow, the fall being very slight, and the natural advantages for mining are very bad. But there are millions in the auriferous deposits of French Creek, and the gold is the purest ever found on the American continent, the mint returns showing it to be worth $24 an ounce. The deposits are so flat, and the water supply so limited, that these diggings are not likely to be a successful field for the labor of the poor man. They can only be handled by company organizations controlling considerable capital. Steam hydraulics have been suggested; they would undoubtedly be successful on the adjacent hills and some of the higher bars, could an adequate supply of water be obtained.

The French Creek deposits are very extensive, the main gulch being miles in length, and having some promising tribu-

taries, and they will give employment to several thousand men, when fully opened.

The quartz interests about Custer City are important. Many gold-bearing ledges have been discovered, some of which are being developed as vigorously as the limited means of their owners will permit. The mica deposits are worthy of note. Blocks of pure mica are obtained, which will shelve off in unfractured plates of from six to twelve inches square; it is found in inexhaustible quantities, and is pronounced of good commercial quality, being worth from four to six dollars a pound in the markets. This may become an important source of wealth.

The Spring Creek deposits are 18 miles north of Custer, on the road to Deadwood. In their topography and geological formation, they look much more favorable for gold than French Creek district, being nearer and more directly connected with the eruptive portions of the Hills. Rich deposits are found in Creek Hill gulch, and bar ground, and they are extensive enough to give thousands employment. But the Spring Creek deposits, like those of French, demand capital for their development.

The creek ground lies more advantageously to be worked than that about Custer, but it is so very deep that much money must be expended in preliminary work before pay can be realized, and water can only be brought over the hills and higher bars by means of a great deal of costly fluming. Capitalists are now directing their attention to Spring Creek district, and, no doubt, several millions will be realized from it within a few years. The Spring Creek quartz interests are also important. Many very promising veins have been located, and crossing Spring Creek there is a quartz belt which is said to be 1,000 feet wide and over 30 miles long. Here, as along French Creek, there is an abundance of the finest wood for timbering shafts, fuel, building, etc. The formations are granite and slate, with lime often capping through the primitive rocks.

Fifteen miles north of Spring Creek, following the Deadwood road from Custer, we reach Rapid Creek, just half way between Deadwood City and Custer, and in the very center of

e Black Hills gold region. It is one of the most beautiful the mountain streams, its water being as clear as crystal id delightfully cool in the hottest weather. It has an aver- e width of about twelve feet, an average depth of fifteen ches, and is the only stream in the eastern part of the Hills nich flows continuously the year through. It was on this ream. as credibly reported, that the Indians found and pre- nted to Father De Smet many years ago a gold nugget worth veral dollars, the Father being camped there with the Indi- s at the time. Here we have what the old miner would call the regular old-fashioned gold wash." In the pebbly bed of apid a great deal of water-worn quartz is found, and the con- guous hills, gulches, and bars prospect richly, as a rule. It generally believed that Rapid Creek will prove the most pro- ictive portion of the Black Hills. When the necessary aming shall have been made to cover this rich, high ound with water, so that a system of hydraulics can be car- ed. the yield must be enormous.

The Rapid diggings are many miles in extent, and will give nployment, when fully developed, to many miners. Some ry promising gold-bearing quartz veins have been discovered Rapid Creek district, and silver discoveries have lately been ported from there.

I am indebted for much of my information concerning the ack Hills to Mr. H. N. Maguire, who has made a careful amination of the country. He is very enthusiastic about its ture prospects, and in summing up the resources of the gion, he says:

"I may be over-sanguine, but I believe all those vast regions ained by the southern tributaries of the Yellowstone, or the ajor portion of them, comprise the richest mineral fields on e continent—gold, silver, copper, iron, and coal: and per- ps platinum, quicksilver, and other metals. They have all e other natural elements of imperial wealth and expansion: od soil, illimitable pasturage, health-giving climate, and a tem- rature delightful in summer, and very endurable in winter. ow that the Indians are about whipped into submission, I ve no doubt emigration will pour thither in unprecedented

numbers, soon resulting in an unbroken chain of industries, from the corn fields of Dakota to the stock ranges of the Yellowstone. The farmer and miner will sustain each other, while both will need and will be able to generously remunerate the artisan and tradesman. Honest industry in every field can not fail to be crowned with success."

When perusing the estimates of the gold-yield of the Black Hills, we come to the conclusion that the total yield has been, for the year 1876, about $2,000,000.

Let us compare this with the yield of the other gold-producing countries:

California produced in 1848 (estimated), - -	$3,826,230
In 1849 (returns manifested), - - - -	4,921,250
In 1850 (returns manifested), - - - -	27,676,346

These are the first three years of the California gold fever. It is difficult, at this late date, to calculate the exact amount of gold kept in the hands of miners, as specimens, and as a circulating medium, during the first year (1848), but suppose we place the amount at $173,770 (which is a liberal estimate), we have then $4,000,000 as the yield of gold in 1848. Taking into account all the amounts which usually escape the official returns, and also the amounts buried by the miners until their return to the states, the most liberal estimates of these, added to the official returns, can hardly place the yield of gold from this state in 1848 over $10,000,000.

Nevada produced from her placer mines from 1849, the year of the discovery, to 1859, when they ceased working them, both years inclusive, only $400,000. This was produced, however, mostly by Chinese miners, of whom there were only about 200 in the mines. It will be remembered, also, that the placers of Nevada were never very remunerative, and that they decreased in the amount of yield as we approach the final year, 1859.

Oregon, in 1866, only produced, - - -	$2,000,000
Montana, with an area of 146,689 square miles, produced, in 1862, from her placers, - -	300,000
In 1863, - - - - - - - -	8,000,000

mpossible to give a correct estimate of the yield from
) for the year 1859, her first year, but the most liberal
would hardly place it above $800,000; the entire
cluding the quartz-mills, for nine years, from 1859 to
only $30,000,000. Of course there are several causes
: is not necessary to enumerate here, which operated
igainst any large yield from Colorado during these

Black Hills proper has a superficial area of about 6,000
niles. The bulk—we might almost say all—of the
oduced thus far from the Hills is from placer mines;
tz interest has as yet hardly begun to be developed.
ring to the comparative figures, it will be seen that,
ing her area, and the disadvantages which have sur-
her, the new El Dorado has done remarkably well
r, even if we confine her to the $2,000,000 which I
ounted for. She stands upon a very favorable footing
of the auriferous districts during their early days.
rtz interest will give a large increase in the yield of
his year (1877), both in gold and silver and we may
ace the yield for 1877 at $7,000,000.

MINING UNDER LAKE SUPERIOR.

the most remarkable mines in America is the one
s Silver Islet in Lake Superior. It once was a small
ock; its greatest width was seventy feet and its length
et. It was only eight feet above the water, its position
out three-quarters of a mile from the main land, and
to a sweep of 200 miles of Lake Superior.
tions were begun there on the first of September, 1870.
date a party began the erection of cribs, and thirty
re were put in place 460 feet of cribbing, thoroughly
gether, filled with rock, and having an average depth
en feet. Such an enormous extent of work was only
shed by the force working unitedly, as one man,
hours out of twenty-four. Inside of the crib-work a
m was constructed, enclosing seventy feet in length of
rop or back of the vein.

The water in the enclosed space was thrown out by steam siphons, and mining was commenced on October 5th. Everything worked successfully until October 26th, when 200 feet of breakwater was carried away by a heavy southeast gale. The coffer-dam also suffered considerable damage, and the pit excavated on the vein was completely filled with rock from the cribs. This breach was filled more substantially than at first by a double line of crib-work, having a base of twenty-six feet; the coffer-dam was repaired, the pit cleaned out, and mining resumed on November 18th, which was continued until November 26th, when the last shipment of ore was made for the season.

All through that season and the next the work was constantly interrupted by accidents. Whenever a severe storm arose the sea rolled in heavily and broke down portions of the dam. or crib-work, so that the mine would be flooded and the miners driven from their posts. But in spite of these delays, coupled with the small space in which the men could work, more than a million dollars worth of ore was taken out.

The mine is one of the richest ever opened in the country. The great deposit of ore occurs in a fissure vein having a bearing of N. 32° W., the dip or inclination being to the N. E. The vein is well defined at points, having good walls or clearages, but not uniform in width, opening out at points to 12 or 15 feet, and again closing up to a string of not more than six inches. The average width, however, might be put down from four to five feet. Still, aside from the vein proper, there are several strings or feeders, some of them at a distance of 30 feet, carrying rich packing ore.

The vein substance generally consists of calcareous spar and dolomitic spar, with quartz, in which are enclosed occasional masses of dioritic wall rock, slate, and plumbago. The contained minerals are galena, zinc, blende, iron pyrites, kupfer, nickel, cobalt ore, with small quantities of antimony, native silver, and silver glauce, or sulphuret of silver.

The deposit of silver is found at the intersection of the vein with an immense belt of diorite and plumbago. This diorite

ıtrusive mass, cutting nearly perpendicularly through ginal more or less horizontal formation of slates and ıtary or silicious sandstone. The ore varies in value 00 to $7,000 per ton, the general average being not far .,500 per ton. This is known as packing ore, for the hat it is packed in barrels for shipment. In addition re is a broad vein of stamp rock, valued at from $45 to ton.

ein, taking a northwesterly and southwesterly direc- osses Silver Islet, where it was discovered. On its north from the Islet the vein goes out of sight, being by the lake for about 3,000 feet, and then makes its nce on Burnt Island; submerged again by water for a of 350 to 400 feet, it reaches the mainland, on which e traced for a long distance.

g south from Silver Islet, the vein passes under Lake r, and is said to cross Isle Royale, some twenty miles sels have been run out from the shafts, so that the work far under the lake, and during heavy storms they inctly hear the roar of the waters. But although the placed below the lake, its position, so far, has not put it at disadvantage, compared with other mines producing

e are features about this mine which actually make it a as regards cost of working. The two great causes ncrease so rapidly the cost, and delay the progress of everywhere, are influx of water and the meeting with s termed soft ground. This mine, so far, has been nearly 700 feet. The longest level opens up the vein 30 feet, and yet by pumping some 155 gallons per min- mine is kept dry. Most of this water enters from and is therefore not expected to increase in proportion depth obtained in the future. Many mines, although l on high and dry land, have to pump far more water his. The rock here being less pervious to water than re, can only be accounted for by the fact that a longer is elapsed since this region has undergone any serious

volcanic disturbance. Some narrow belts of slaty shale lying next to the vein are identical, except in age, with the clay found next the true veins in other places.

The vein rock itself is of a hard and firm nature, needing but little timbering for support. Three samples, taken from the vein yet remaining in the roof of the mine, showed, from concentrations and assays, as follows:

1.	South end of vein, silver per ton, -	7,346	ozs.
2.	Middle of vein, - - - -	2,886	"
3.	North end of veins, - -	5½	"

The concentrations of No. 1 had hardly more than a trace of galena in them, being native silver, etc.

No. 2 was mixed, consisting of galena and native silver.

No. 3 was pure galena.

The mineral is called McFarlanite, from the man who first brought it into notice, it being unlike any other silver ore, a mingling of nickel giving it a peculiar tinge and a beautiful arborescence.

The mine has ten levels or adits running north and south, besides several cross-cuts east and west. They have lately been boring with a diamond drill west of the main vein, thinking to find another feeder similar to the east vein, or to ascertain if the streak that is seen in the water west may be a deflection in the main vein.

They descend by ladders only, the shaft being used solely for hoisting rock. They have Burleigh compressors and all modern appliances. Occasionally they strike gas, which throws out a jet of great power—at one time of forty feet—and burns for a long time when lighted. A miner once came upon a natural cavity, where he felt sure he was to touch the bonanza; so he inserted his head with the candle in his hat. It came out quicker than it went in, but without hair, whiskers, eye-brows, and almost without scalp. Holes are encountered discharging water, or water and gas combined. Some of the miners are apprehensive that they will by and by reach the bottom of the lake and fall into an enormous cavity, which will take them, perhaps, to the center of the earth.

XLIII.

CALIFORNIA AND HER TERRESTRIAL TREASURES.

WONDERS OF THE PACIFIC COAST—CALIFORNIA IN 1835—CAUSE OF HER RAPID PROGRESS—THE HONEST MINER OF THE OLDEN TIME—FATE OF THE FORTY-NINERS—EFFORTS OF A NOVICE—RUSHES TO NEW PLACERS—CHANGE FROM PLACER TO QUARTZ MINING—GRASS VALLEY—EXTENT OF THE GOLD-BEARING RIDGE—AMALGAMATING PROCESSES—SPECULATIONS IN MINING STOCKS—HOW A SHARP NEW YORKER WAS SOLD—A LUCKY HIT—COPPER MINES IN CALIFORNIA AND ARIZONA—NEW ALMADEN AND ITS QUICKSILVER—BENEFITS OF AN EARTHQUAKE.

For a few years after the discovery of gold in California, little attention was given by her inhabitants to any other pursuit than mining. But in course of time the agricultural resources of the State were developed, and California soon made herself one of the grain-supplying regions of the world. The mines do not hold such a prominent place as they did fifteen years ago, but they are still an important source of wealth to the Pacific coast, and will so continue for a long time to come. Had there been no discovery of gold or other precious metal west of the Rocky Mountains up to the present time, California would to-day be but little advanced beyond the condition in which she was found by the author of "Two Years Before the Mast," when he landed on her shores in 1835. The cities along the coast would have grown larger, and the number of ships trading to San Diego, San Francisco, and other parts would have steadily increased, but the traffic would be mainly in hides from California cattle, or in the very few articles that were then the produce of this region. San Francisco could not have become in a few years a great city, without the discovery of gold in the streams and on the hill-sides of California.

The first rush of gold-seekers in 1849, and for two or three years subsequent to that date, was to the diggings along the various rivers and their tributaries. Men came, with pick and shovel, to gather up a fortune by separating gold from the earth along the valleys. The honest miner, with the tools of his profession, with his bronzed and unshaven face, his hair unkempt and matted like locks of wool, his clothing of the roughest character, and utterly innocent of whisk-broom or cologne water, was a figure well known on both the Atlantic and the Pacific coast. In California he existed in reality, but in the East he was drawn in caricature as something that all California emigrants must become. He toiled in the sands of the Sacramento and its tributaries, now with a run of good luck that sent him rejoicing to his home in the East, or furnished the material for a "high old time," and again, with ill fortune that left him, after long exertion, with very little of the valuable metal in his own right.

The race of miners has not become extinct, as any one who has visited the interior of California can testify, but it is by no means as numerous as of yore. A large number of men who now stand high in the business world, began their California life by working in the mines. Many of the former miners have gone to their homes in the East, or to those undiscovered regions where gold is said to be of no particular use. Many long since drifted to other gold-mining countries, and many others have taken to agriculture, or to some business more certain—though less seductive—than gold-hunting. Most of the placers have been washed out and abandoned to the Mexicans or Chinese. Localities that formerly supported a large mining population are now deserted, while others can still count a goodly number of inhabitants. Whenever a new region is opened up there are many persons ready to rush to it, in the belief that they will find the fortune they have so long sought. Fraser River, Washoe, Kern River, and other regions have all stood high in the bill of attractions, and all proved more or less delusive. Hardly a year passes without a new discovery somewhere, and a consequent rush of emigration. Human

remains the same, and there is no probability of the
. of a time when men will no longer be tempted by ex-
ant stories to go in quest of a fortune.

he early days, thousands of persons landed at San Fran-
vith no definite knowledge of the country, and with the
sion that the gold mines were within a few hours' walk
city, and possibly inside its corporate limits. The story
of a party of emigrants who came ashore from a steamer,
asted at a cheap hotel, and then, with their mining tools,
ded to the beach at the foot of Telegraph Hill, and began
ıg for gold. The Sacramento was the deposit of a
r wealth than that of the Indies; they argued that all
ıter in the bay of San Francisco had come from that
and therefore all the earth that it touched must be auri-
. Only a day's toil in that locality could convince them
ıeir theories were incorrect.

re was very little geological or other science applied to
:ly mining, as very few of the miners had any knowledge
direction beyond what they acquired by practice. Men
nere they could find pay-dirt, and abandoned places that
t pay for their labor, but they could not often give any
why one spot in a valley was richer than another.
g was almost wholly a matter of experiment, and to this
.e theories of the school of mines are of comparatively
alue in the eyes of many miners. Many of the ordinary
of geology are overthrown in the formation of the Pacific
so that the scientific geologists who have gone to Cali-
find themselves involved in perplexities at almost every

revelations of General Sutter's mill-race established the
ıce of gold in California, and the news spreading rapidly
hout the world, brought a large migration. The first
s were nearly all adventurers without capital, and though
lk of the immigration continued of this character, the
, and subsequent years saw men of capital and intelli-
going there to give a better direction to the interest of
untry. The pick and pan, the primitive rocker, the long

tom, the sluice, the tunnel, and other accessories of placer mining, marked the successive development of means for robbing the earth of its treasures. These operations culminated in hydraulic mining, which may be fairly considered as the perfection of this branch of work.

Of course it was but a single step from the discovery of gold in the dirt of the valleys, to its discovery in the veins of rock that formed the hill-sides and mountains. The rock from these veins was carefully assayed, and its richness established. Mere hand work was of no avail, or would be unprofitable in reducing these ores and extracting the metal. Heavy machinery must be erected, deep mines must be opened; shafts and wheels and pits would be expensive, and so would be the erection and mangement of machinery. Hence the necessity for capital and intelligence in this kind of labor. Individuals and companies led off in this work, and so quartz mining followed upon placer mining, and became a business of magnitude.

The best established gold mines in California are at Grass Valley, a neat little city in Nevada County, twelve miles from the Central Pacific Railway, and for some time the home of the once noted and notorious Lola Montez. The other quartz mining districts are scattered through the mountainous region of the State, but the localities where the mines are profitable are not very numerous. Further explorations will of course increase their number, but it is not very probable that the development will be rapid.

In placer mining, the object is to separate the gold from the dirt where it has been deposited, and to accomplish this, water and labor are the only necessities. The dirt or earth is to be carried away while the gold remains. This is the whole process, whether we employ the simple pan and rocker or some more elaborate means of working. But in quartz mining the process is more complicated. The rocks must be taken from the veins and brought to the surface. There it lies, solid rock, with the gold mixed into its whole mass, while in a fluid state, just as salt or soda are mixed with flour in making

bread. It must be reduced to powder, and for this purpose heavy machinery is employed. When reduced to a powder, the gold must be extracted, and this work requires more care and causes more perplexities than other labor connected with quartz mining. Besides the gold, there are various chemical compounds, some of which remain, while others may be washed away. Many men must be employed about a quartz mill; the monthly disbursements, provided the owners are honorable, are very large. Hence, while a man without capital may become a miner in the gulches and placers, the beginner in quartz mining requires both brains and capital.

The quartz district, which is from fifteen to a hundred miles in width, commences in Mariposa County, and extends along the western foot-hills of the Sierra Nevada for four or five hundred miles, disappearing somewhere in Oregon. The ledges of rocks lie at various angles, being in some places almost horizontal, while in others they vary little from the perpendicular. There are various theories touching the formation of the quartz ledges and their impregnation with gold, but none of them will apply to all cases. The mines that have been opened are along this ridge, and many shafts have been sunk for the purpose of reaching this rich rock. A considerable proportion of these shafts have been abandoned because they did not reach the ledge, while others have been forced to quit, because the ledge, though containing gold, was unprofitable. As before stated, those most generally successful are at Grass Valley, where the rock does not vary much in value, and where the profits of a year's labor can be estimated beforehand with considerable accuracy. Year after year the work has gone on, and the town of Grass Valley has a more thrifty appearance than the majority of the mining centers of California.

There is very little difference in the character of the quartz mines and mills throughout California. Where the vein is perpendicular, or nearly so, the shaft is sunk directly through the vein; but where it lies at an angle, the shaft is sunk so as to strike the vein at a given distance from the surface. In

either case, galleries, called levels, are run off from the shaft into the vein, sometimes for a long distance. At the surface, the vein may be but a few inches in thickness, but it gradually widens as it descends, so that some of the veins have a width of twenty-five feet or upwards. Along the levels the ore is brought to the shaft, and then sent, in buckets, up to daylight. In extensive operations, there are numerous shafts, galleries, and levels that connect with each other and form a subterranean net-work of streets and alleys. Once on the surface of the earth, the ore is sent to the mill, where it is first broken into small pieces and then reduced to powder by the action of the crushing machinery.

Various kinds of machinery have been devised for reducing the ore, the first being the stamp-mill, which consists of a row of heavy pestles, standing in troughs. These pestles or stamps are raised by steam power, and fall by their own weight. They are from four to eight in number, and sometimes there are twenty or more; they operate just as do the feet of the smiling maidens in the vineyards of France, when treading out the juices of the grape. No other mill has proved superior to this in reducing the ore; the testimony of miners and capitalists is almost unanimously in favor of the stamp-mill.

A stream of water pours into the trough where the ore is being crushed, each stamp falling from ten to eighty times a minute, and mixing the water and pulverized rock together. This runs upon blankets, which catch a portion of the gold; then it passes over a sloping surface, cut with horizontal crevices, filled with quicksilver, that catches all the gold it touches; then through a series of troughs and sluices, with occasional beds of quicksilver, and so on to a heap of wastes.

No perfect process of saving the gold has yet been invented, and much of it is still carried away in the sand or "tailing" of the mills. Rock that assays $40 or $50 to the ton will rarely yield more than half or two-thirds that amount, and sometimes falls far below it. Some of the mill owners claim to be satisfied with their present process, while others are constantly making experiments. Whoever succeeds in finding a

cheap and effective means of saving all the gold in the pulverized rock, has a sure fortune before him. Many of the ores contain sulphurets of various kinds, and these are nearly always more or less refractory. Many of the mills are reserving their "tailings," to be worked down again when some successful inventor makes his appearance. Some mill owners save the sulphurets from the ores for the purpose of selling them to the agent of an English house, who buys them for shipment to Wales.

Most of the quartz mines in California are from one hundred and fifty to six hundred feet in depth. The deepest and richest gold mine in the State is that known as Hayward's mine, on Sutter's Creek, Amador County. Its owner was unable to make it pay expenses for a long time, but it grew richer as it descended, and for the past twelve years or so has paid a handsome profit. Sixty tons per day are taken out and crushed; the operation goes on constantly, night and day.

The history of this mine seems to settle the question about the profitableness of deep mining, as the ore grows richer the farther it gets from the surface. The mines at Grass Valley steadily increase in richness as they descend from the surface. The owners of one mine have been pocketing a profit of $200,000 per annum.

All the fortunes made in California mining operations have not come from actual work upon the ledges. A great many men who never saw a mine have become rich by speculation in mining stocks; some of them have kept their money, but the majority have been unable to hold to it, in consequence of their eagerness for more. It is safe to say that more fortunes have been made by lucky sales of stock in mining companies than by holding for dividends. There have been some very large speculations in this kind of property, and at one time Montgomery street in San Francisco rivaled Wall street in New York in the magnitude of its operations. It is still a scene of financial activity, though the speculation is less than of yore.

The California speculators are up to all the tricks and equal to the smartest of the Wall street men. A New York capital-

ist went there once with the laudable intention of "cleaning them out." There had been a little flurry in the stock of a certain company, and it was well known who were the holders of the property. One day he received a telegram announcing that this mine had suddenly developed immense quantities of very rich ore, and the stock would consequently make an enormous advance. Other persons, who claimed to be his friends, received the samo intelligence, and told him of it in the strictest confidence. The bait took, he bought all accessible stock of that company, paying a liberal price, and rejoicing at the reception of his news in advance of the market. The telegrams were all bogus; his pretended friends assisted in stocking the cards so as to win. The operators on the street used to speak of this as a very neat transaction, and declared that Wall street could not excel it.

A great deal depends upon knowing when to sell out. A friend of mine once bought fifteen feet of a mine, just opened, at ten dollars a foot, and sold it a year later at sixteen thousand dollars a foot. Three months later it could have been bought for not more than ten times the original cost. One man, who held on, is still keeping ten feet of the same mine, and is likely to do so.

Copper mining has been prosecuted to a considerable extent in California, and at one time was very profitable, owing to the war between Spain and Chili, which excluded the latter country from the copper market. The principal copper mines in California are at Copperopolis, in the foot-hills of the Sierra Nevadas, about forty miles from Stockton. The ore is extracted in the form of sulphurets, from a vein about twenty feet in width, which has reached a depth of more than six hundred feet. In consequence of the expense of smelting works, and the cost of fuel, it has been found more economical to send the ore to England, and to the Atlantic coast, for reduction. The sulphur is driven off by heat, and, after undergoing various manipulations to rid it of foreign matter, the fine copper remains. There are several mines at Copperopolis, all of them on the same vein. The most profitable of them employed

at one time more than twenty ships in freighting its ore to the places where it was smelted. The net profit to the owners of the mine for one year, during the Chilian war, exceeded half a million dollars, but it fell off greatly with the return of peace.

The ore contains an average of twenty to twenty-five per cent. of copper, the balance being sulphur and other chemicals, in combination with such earthy substances as are ordinarily encountered in sulphate veins. The richest copper mines of the coast are in Arizona, very near the California line. Specimens from a mine on "Bill Williams' Fork," eight miles from steamboat navigation, on the Colorado River, assayed from sixty to seventy per cent. of copper. The ore from these mines ought to yield from forty to fifty per cent. pure copper, and the miners are confident of a richer return than this as they descend into the earth.

Arizona is also rich in silver and gold, particularly the former, but the climate is so unhealthy, and the Indians have such a persistent habit of killing white men on frequent occasions, that a residence there is not as desirable as a home on the banks of the Hudson, or the Ohio. But as we are always ready to go wherever there is a prospect of money-making, this out-of-the way territory bids fair to become peopled before many years have passed away. Steamboats are running on the Colorado, and the Southern Pacific Railway taps the country, so that the mines near it have a good prospect of development. Some of the companies now in operation in Arizona sell their ore to speculators, while the balance ship theirs to England for reduction.

The want of good coal mines is severely felt in California. Coal has been discovered, and is being taken out in considerable quantities at Mount Diablo, thirty miles from San Francisco, but it is of inferior quality, and unfit for many purposes where coal is used. The same is the case with the coal from Bellingham Bay, British Columbia, and from nearly all other points on the Pacific coast where mines have been opened. The river steamers burn the California coal. Some of the founders use it, as well as all the establishments on land where

the making of steam is the only object. It is said that ocean steamers cannot burn it, in consequence of its tendency to spontaneous combustion, when kept in the hold of a ship for any considerable time. Coal is taken there from the Atlantic seaboard, and from Sidney, New South Wales. If a mine, favorably located anywhere on the Pacific coast, furnishing a good quality of coal, could be found, it would yield a fortune to its owners.

I have spoken of gold, silver, and copper among the minerals, but there is another metal which is an important product of the coast, though the area of its production is somewhat limited. I allude to quicksilver, which exists in quantities worthy of note, only in Spain, California, and Peru. For a very long time the Almaden quicksilver mine in Spain was the only one known, and it held a rigid monopoly of the trade. The discoveries in Peru opened a new field, but, though it reduced the price for a time, it did not seriously affect it. The discovery in California threw such a quantity into the market, that the whole quicksilver trade of the world is now ruled by it.

The great mine is at New Almaden, sixty miles south from San Francisco. The ore is taken from a mine in the hills on the inside of the Coast Range of mountains, and is found in chambers, instead of veins. Some of the earthquakes that occasionally disturb San Francisco, put money in the pockets of the New Almaden owners, as they open up new and very rich chambers, not previously discovered. The ore from which the quicksilver is taken is about the color of a well-burned brick, and looks, when piled up for use, much like a heap of broken granite and bricks. The ore is placed in furnaces, a wood fire is built beneath, the quicksilver flies off in vapor, and is caught and condensed in air-tight rooms, partly filled with water. After condensation, it is bottled up in flasks containing 76½ pounds, each of these being the same as the weight used at the Almaden mine in Spain.

This mine has been the subject of much litigation, as indeed has nearly everything valuable in California. The product in

one year was 47,194 flasks, worth about $50 per flask, or a total value of $2,359,700. The cost of producing this result was about $800,000, leaving a very fair margin of profit. The ore averages from twelve to eighteen per cent. of quicksilver, and frequently exceeds the latter figure. A piece of the ore which I picked up at the mine, lies before me as I write. It is a deep red color, heavy, like a lump of lead, and is said to contain about twenty per cent. of quicksilver.

A large quantity of quicksilver is used in gold and silver mining on the Pacific coast, and the balance goes to various parts of the world. Of the production of the year I mentioned, fourteen thousand flasks were sent to China, ten thousand to London, five thousand to Peru, two thousand to Chili, seven thousand to New York, two thousand to Mexico, and two hundred to Australia.

XLIV.

RAPID TRANSIT IN NEW YORK.

THE UNDERGROUND RAILWAY SCHEMES. — ELEVATED RAILWAY LINES. — THE WEST SIDE RAILWAY. — TRAVELLING ON LAMP POSTS. — ADVANTAGES OF A SECOND STORY ROAD. — ADVENTURES WITH THIEVES. — PERILS OF THE MODERN STREET CAR. — ARTISTIC PACKING OF PASSENGERS. — THE PNEUMATIC RAILWAY. — VANDERBILT'S SCHEME. — AN UNCOMFORTABLE JOURNEY. — SHOT FROM A GUN.

For several years the people of New York city have been agitated on the subject of rapid transit from one end of Manhattan Island to the other. In one respect, New York is unlike any other city on the globe. Nearly all its business is conducted at one end of the island on which it stands, while nearly all the residences are at the other end. Consequently, a large part of the population must be transported in the morning from the upper part of Manhattan Island to the lower end, and transported back again in the afternoon and evening. All the lines of street railway and the stages are densely crowded at these times. There is not a street car or an omnibus that is not packed to its fullest capacity, in the morning, with people going down town, and packed in a similar way, about sunset, with people going up town.

Travel at these times in the direction indicated is accompanied with many annoyances. On some of the lines of street railway, the passengers are stowed away very much like sardines in a can, or like negroes in the hold of a slave ship. Comfort is not at all considered. Every man is anxious to reach his destination as speedily as possible, and if the seats are all taken, he is willing to stand. Very often passengers are wedged so closely that the movement of one affects nearly all the rest, and a person near the middle of the car

SECTION OF THE BROADWAY UNDERGROUND RAILWAY

it hard work to get out. Straps are suspended from ntal bars running fore and aft the car, and the standing agers suspend themselves from these straps.

ingenious individual has devised a plan whereby the above the heads of the standing passengers may be d. He proposes some additional straps, on which a few agers can be suspended horizontally, very much as fish in a museum are hung up against the wall. The on would be uncomfortable, but comfort is a secondary tiary consideration altogether.

ordinary street car is designed to seat thirty-two pas- rs, but very often as many as a hundred passengers are led on a single vehicle. The front and rear platforms ccupied down to the very edge of the steps. It is nfortable enough when the passengers are sober and ehaved; but when, as often happens, half of them are , and fifty per cent. of the drunken ones are quarrelsome, sition becomes serious. A man who travels late at night nain line of street railway will have his love for sport gratified. He may expect a broken rib every week or nd, as the noble and manly art prevails among the en gentlemen, he can be accommodated with a fight ever he wishes it, and very often when he doesn't.

modern science of pocket-picking is very much in n in New York, and a goodly portion of the inhabitants to be engaged in an effort to make an honest living by g the rest. On a densely crowded car, one can frequently ngs of pickpockets, varying from two to half a dozen per- and unless he is very attentive, they will go through ithout his knowing it. They are skilful operators, and les of the profession forbid the practice of the science the artist is able to pick away a man's eye-winkers with- s feeling it. I always look with pleasure on a man who that no pickpocket can rob *him*. His confidence s carelessness, and the result is, that he is generally d more than any other man.

h a long experience on street railways, it has been my

pleasure to suffer the depredations of pickpockets several times; and I will do them the credit to say that their robberies were almost always committed when I was on the lookout for them, and was quite confident they could do me no harm. They never took my watch or pocket-book, but on two occasions they have taken a letter case out of the inside pocket of my coat, and once invaded my trousers, and carried off a card case which had no cards in it. They have gone through my overcoat, and relieved it of kerchiefs, and gloves, and such trifles, and I was in blissful ignorance of their operations until some time afterwards, when I happened to put a hand in my pocket, and found that my property had gone.

Quite often I have seen the pickpockets "working" a car, and have admired the effectual and artistic manner in which they perform their duty. A few days before writing this description, I travelled with five of these individuals on my way down town, and saw them go from one end of the car to the other, — the vehicle was very much crowded, — and after taking what watches and pocket-books they could find, they left from the rear platform. The cry of robbers was raised a little too late, and when the first announcement was made that valuables had disappeared, they were off the car and three or four blocks away. Two pocket-books and four watches were the result of that evening's enterprise — a very fair compensation for five minutes' work.

The omnibuses are somewhat better in character than the street cars, though they do not afford accommodations for standing, especially if the passenger happens to be in the vicinity of six feet high. Many persons do stand in them, however, and revenge themselves for their discomfort by treading on the toes of the sitters at every lurch of the carriage. Intoxicated people do not ride in the omnibuses as much as in the street cars, partly for the reason that the majority of drunkards live on the railway rather than on the omnibus routes, and partly for the reason that it is not so easy to enter an omnibus as to enter a street car. The car has a conductor, whose duty it is to assist passengers on board

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and collect their fares, to kick off the disorderly ones, and keep everybody on good behavior. Between the pickpockets and passengers, the conductors generally occupy a neutral position, very much like the woman in the celebrated contest between her husband and a bear. The omnibus has no conductor, and as no one is responsible for the conduct of the passengers, they generally behave much better than on board a street car. If a man misbehaves himself in the former vehicle, his fellow-passengers eject him; but in the latter conveyance, the passengers do not wish to take upon themselves the conductor's duty, and as he is generally unwilling to perform it, it is not performed at all.

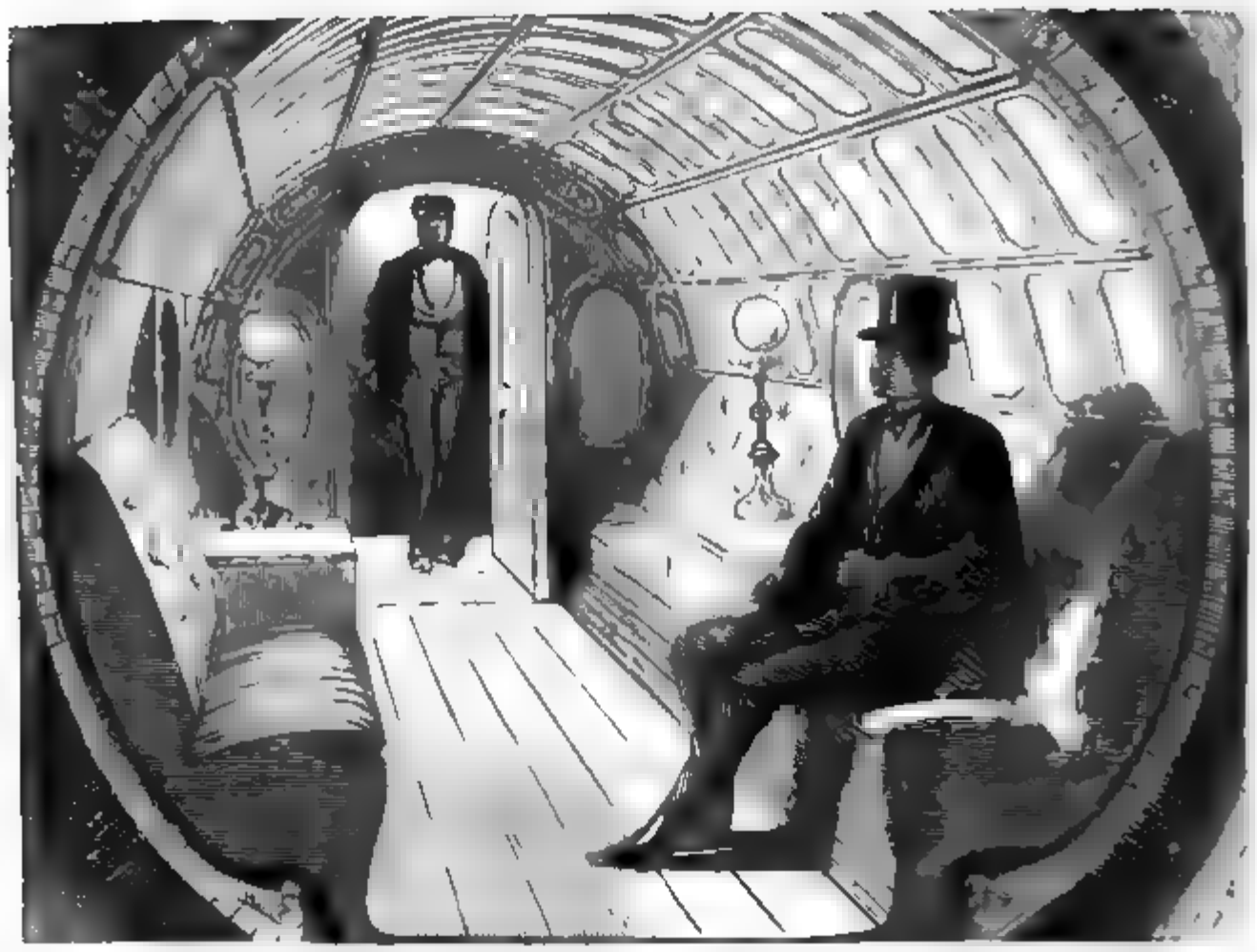
Time is an important consideration on these lines of travel. There are so many stoppages for landing and receiving passengers, so many blockades arising from vehicles in the street, and from other causes, that the journey from end to end of Manhattan Island is not a rapid one. From the City Hall to Harlem, the ordinary time required is an hour and a half, and proportionally for other distances. The omnibus is even slower than the street car, as it has not the advantage of rails on which to move, and makes frequent stoppages to wait for its passengers. The consumption of time in city travel, added to the annoyances, makes it very desirable that a more perfect system should be devised.

Consequently the question of rapid transit has been very much debated, and several schemes have been proposed. I shall not attempt to give all the systems proposed for public consideration, as they would occupy much more space than I have at my disposal. Some inventors propose an underground railway, and some propose a railway elevated sufficiently high to offer no obstacle to the passage of vehicles. There has been a great deal of talk on the rapid transit question, but up to this time comparatively little has been done. A single track has been placed in the air on iron posts something like lamp posts, and carried from the Battery through Greenwich Street, and connecting streets and avenues, as far as Thirtieth Street. It is very doubtful if it ever gets any

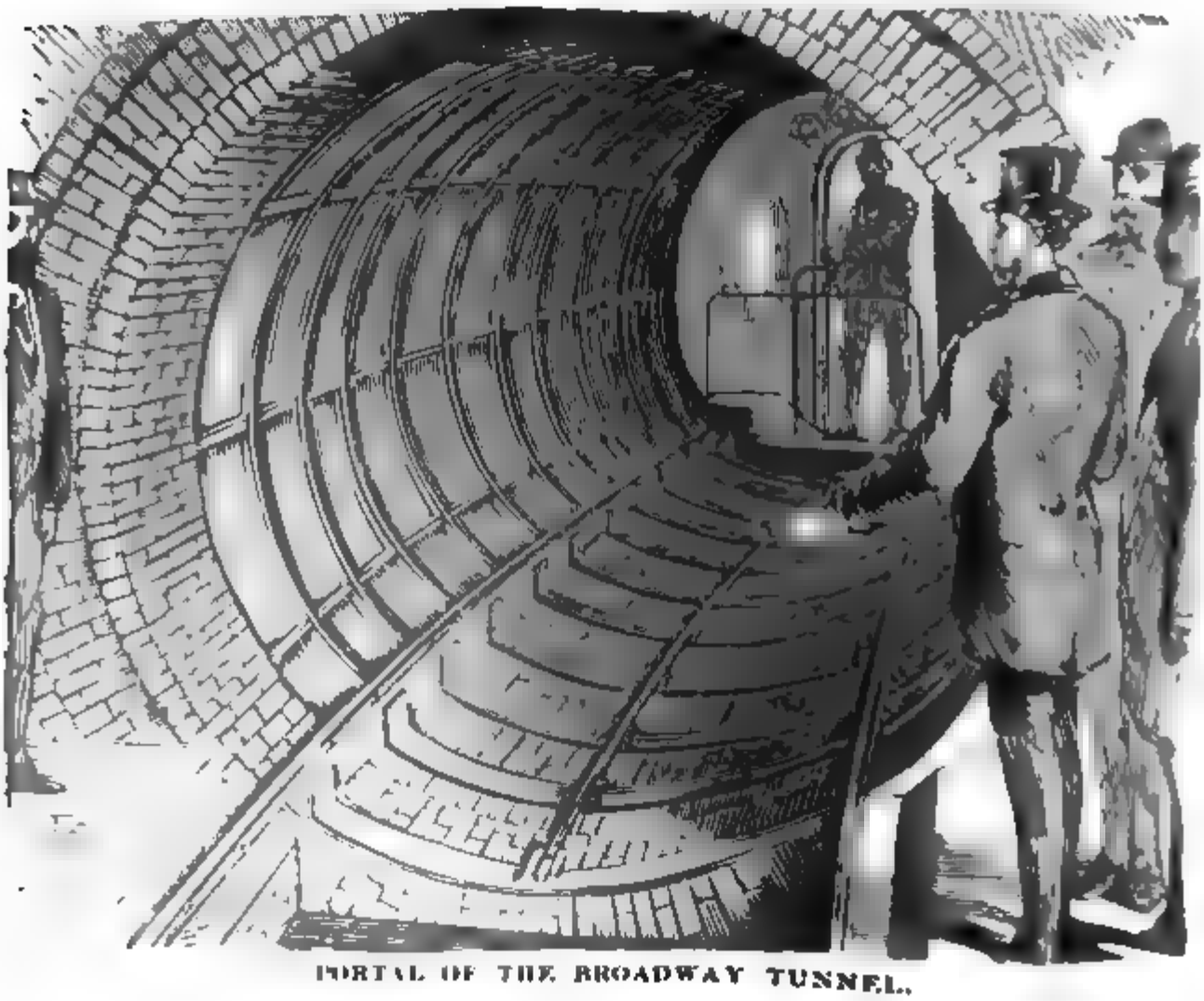
farther, or if anything more than a single track is built. Th enterprise thus far has not met the expectations of its pr jectors. It has swallowed up a great deal of money, an secured very little travel. It carries passengers at a fai speed, but it has had two or three accidents that have ren dered the public distrustful of its accomplishments.

It possesses one advantage — that of enabling strangers t study the private life of the people on second story floor along its route; and for this reason I presume distinguishe foreigners, who come to New York, are generally invited t make a journey over this railway. By no other means now known can so good a knowledge of the domestic habits of New York be obtained. A gentleman who made a journey in on of the cars of this road soon after its opening, stated that h counted ninety-seven families at breakfast, of whom thirty three were eating fish, twenty-seven were eating beefsteak or mutton-chops, while the balance were sticking to bread and vegetables in various forms, or were breakfasting on noth ing at all. He saw thirteen family quarrels in various stage of progress, and observed one lady, apparently of foreign origin, discussing home affairs with a broom-handle. He obtained an intimate knowledge of wearing apparel for both sexes, and saw a great many things he had never seen before and hardly expected to see on so short a journey.

Soon after this Elevated Railway was begun, some enter prising gentlemen undertook the construction of a railway under Broadway, on the pneumatic plan. They leased a cellar at the corner of Broadway and Warren Street, dug a tunnel under the sidewalk, and thence directly under Broad way for a distance of two hundred and fifty feet. It had been claimed that an underground railway could not be made beneath Broadway without interfering greatly with the traffic of that busy thoroughfare. The projectors of this line, known as the Beach Pneumatic Railway, contended that they could do their work without interference with travel, and they not only did it in that way, but they kept the entire public ignorant of their operations until they were



INTERIOR OF PNEUMATIC PASSENGER CAR.



PORTAL OF THE BROADWAY TUNNEL.

ready to throw open the completed portion of their line for inspection. They were at work three or four months before any outsider obtained the least hint of what was going on, and for the last few months of their work, the public dwelt almost entirely in conjectures. It leaked out that something was being done there, but what it was, nobody could exactly tell.

Finally, a certain day was fixed for the opening, and a great many persons were invited to be present. They found a comfortable station and waiting-room under the sidewalk at Warren Street. They found a passenger car on the track, and a well-lighted tunnel, through which they could walk, and listen to the rumbling of carriages overhead. The tunnel was as dry and comfortable as brickwork and whitewash could make it. Telegraph wires extended from end to end, so that communication could be had at any moment with the engineer: and although the distance was short, the car, in moving along the track, attained considerable speed. They found powerful machinery, capable of forcing thousands of cubic feet of air per minute, and propelling the cars at a rapid rate. The machinery was moved by steam power, and the cars were propelled by the force of the air pressing against them. Whether the tube was five yards in length or five miles, as long as it remained tight the car could be driven by the power of the stationary machinery.

Unfortunately for the rapid prosecution of the enterprise, the Pneumatic Railway was not, for the purpose of carrying passengers, a chartered institution; and up to the time of writing, it has never progressed farther than a single section, between Warren and Murray Streets. Its projectors have full faith in its ultimate success, and certainly the result of their enterprise, so far, has been satisfactory. They claim to be able to drill their tunnels for any distance, under any part of the city, without interfering with business; and they even propose to push their way under the East River, and thus extend their route to Brooklyn. They propose to have stopping-places every half mile, where passengers can be taken up and

left, and they promise to run their cars from one end of New York to the other inside of half an hour. They promise that there shall be comfortable weather at all seasons of the year, and are very certain that their route will never be blocked with snow. They assert that collisions are impossible, because their mode of propulsion is such that two cars cannot approach or go from each other on the same track at the same time. One of the great troubles of operating a line of railway by steam is the impossibility of making two trains pass each other on a single track. Many a railway engine-driver has attempted it, but on every occasion he has come to grief, and has generally brought some of his passengers to an unhappy end. On an atmospheric railway the attempt to make such a meeting and passage is, from the nature of things, impossible; consequently accidents from this cause can never occur.

Another atmospheric railway proposed for New York is to be elevated in the air. An iron arch is to be thrown over the streets or avenues, sufficiently high to permit the passage of vehicles beneath it, and sufficiently strong to sustain a great weight. On the top of this archway two large tubes are to be placed, each tube nine or ten feet in diameter, and having a railway track inside, where car-wheels can run. The pneumatic system is to be applied to the propulsion of these cars, very much as it is used to propel the cars on the underground line already described. It would possess most of the advantages of the underground system, and there is no good reason to predict the failure of a line constructed in this way.

Another elevated railway has an iron arch, similar to the one just mentioned; but the roadway is open, and the cars are propelled by steam. Its advocates are sanguine of success, and its opponents say that it would frighten all the horses that come anywhere in sight of it when its trains are in motion. But if the horses choose to get frightened, that is their affair; and the probability is, that they would soon become accustomed to the strange noise, and behave themselves properly. Horses can be accustomed to anything. All that is wanted is proper training.

Somebody has proposed a three-tier railway, having one line or track under ground, another at the surface, and another elevated high in the air. His scheme is a magnificent one, and has a good many advocates; but the probability is, that some of the rival enterprises will be completed before this is adopted, mainly for the reason that the cost of their construction is much less.

Several years ago an underground railway company was chartered, and set about the construction of a line. A little work had been done, and only a little. The route was surveyed and laid out, and the managers of the company set about raising the needed capital. Somehow the desired money was not forthcoming, and up to this time the railway has existed more on paper and in the minds of its advocates than in the locality where it was to be constructed.

A year or so after this line was chartered, another scheme was proposed for making a railway on brick arches, to be known as the Viaduct Railway. It was in the hands of men then in power in New York, and soon after the organization of the company it was announced that a large amount of stock had been taken. The route was surveyed, and maps were published, showing the proposed line of travel. There were many real estate speculations growing out of it, and the supposition is, that the managers of the Viaduct Railway pocketed handsome amounts of money out of these speculations; but somehow the public did not grasp with any confidence the enterprise, which was in the hands of the magnates of the Tammany Ring, and the Viaduct Railroad, at the time I write, exists only on paper.

After this failure to meet the much felt want, the genius of Vanderbilt was brought into action. The commodore, as he was called, was able, by the influence he could bring to bear on the legislature, to secure a charter for an underground railway from City Hall to the upper end of the island. He went at it in a business-like way, and promised that in a few years one could ride under ground from the City Hall to Harlem in twenty minutes.

If Vanderbilt had lived to the age of Methuselah, and continued in vigorous health, he would doubtless have done something for rapid transit whenever he found that it would carry business to his railway. But his grand scheme of several years ago amounted to nothing, and shrewd people suspected that he was satisfied with the existing surface roads.

Among the schemes that have been proposed for rapid travel and transportation of freight, there is one which purposes to make use of tubes, either under ground or on the surface, in which spheres or globes shall be placed, and propelled by means of a rapid current of air. The inventor claims that a sphere will move through a tube with very little friction, and can be driven with great rapidity. He would make a tube several feet in diameter, and have his spheres so arranged that they could be opened and filled with freight, then closed, properly fastened, placed in the tube, and started. I believe that he proposes to propel them one or two hundred miles an hour, at comparatively slight expense. For certain kinds of freight this mode of transportation and propulsion might be well enough, but there are things for which it would not answer. Imagine, for example, one of the spheres filled with fresh strawberries in Virginia for transportation to New York. The strawberries would be constantly rolled against each other, so that by the time they reached New York they would be in a condition of jelly.

As a passenger route this line would have great disadvantages. Imagine a man enclosed in a sphere, either doubled or laid out horizontally, to make a journey from New York to Washington. He would be standing alternately on his head and on his feet about one hundred times a minute, and if he went through alive it would be a wonder, and he would be likely to be very much confused; especially if he were not packed tightly in his travelling-box, he would have a rough time of it. Every square inch of his body would be covered with bruises, and, besides, he would have a hard time to breathe, as the supply of air would be exceedingly limited.

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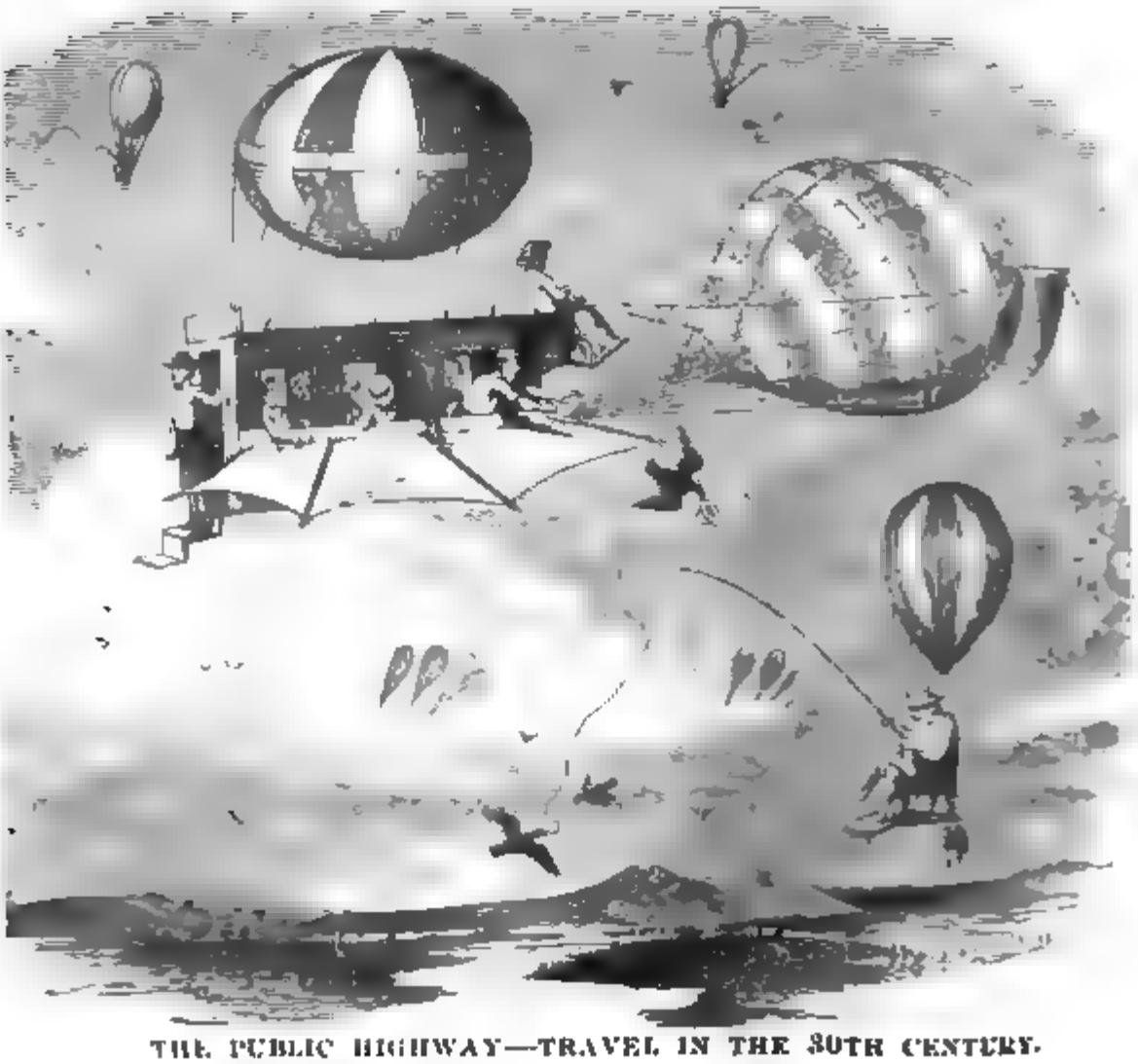
THE BOMB FERRY—TRAVEL IN THE 30TH CENTURY.



THE PUBLIC HIGHWAY—TRAVEL IN THE 30TH CENTURY.

I believe the inventor proposes that all parcels going by his route should be tightly packed; consequently, it would be necessary to wrap the passengers and secure them somewhat after the style of an Egyptian mummy, and stow them in their places by means of an hydraulic press. None of this mode of travel for me, if you please.

I have heard of a scheme of locomotion in which the inventor proposed to load his passengers into a large cannon, having a bore of three or four yards, and then shoot them to their destination. The journey could be made fast enough, but such a mode of travel is liable to accidents, both on starting and stopping. If one could get off and be well under way without being singed by the powder, he would run a great risk of being somewhat injured when reaching his stopping-place. "It was not the falling," said a hod-carrier one day, speaking of a tumble of twenty or thirty feet, — "it was not the falling that hurt me, darling, but the stopping so quick at the end."

XLV.

THE TUNNELS, AND THE UNDERGROUND RAILROAD IN LONDON.

DESCRIPTION OF THE LONDON HARBORS—THE CATHARINE DOCK—ENORMOUS STORE-HOUSES—HOW THE TUNNEL WAS BUILT—PLAN OF THE FRENCH ENGINEER, ISAMBERT BRUNEL—HOW THE WORK WAS CHECKED BY A BREAK IN THE BED OF THE THAMES—SIX LIVES LOST—REMARKABLE RESCUE OF THE SON OF MR. BRUNEL—ENORMOUS LABOR AND STRUGGLE AGAINST THE ELEMENTS—TRIUMPH AT LAST—THE MOST REMARKABLE RAILROAD IN THE WORLD—LONDON CROSSED UNDERGROUND BY A SERIES OF TUNNELS—HOW LIGHT AND AIR IS PRODUCED—THE NEWEST IMPROVEMENTS OF THE ROAD—THE CARS PASSING UNDER THE DWELLING OF THE DEAD.

The London harbor belongs to the grandest and most interesting ones in the world. Here in vivid writing the history of the English commerce is recorded; from this point, a gigantic net of navigation is spread all over the globe. Voices from all parts of the world, of animals and men; all human races, of every color, from the deepest black to the palest white of the inhabitants on the shores of the White Sea, are met with. Merchandise is taken in here, which has undergone an uninterrupted travel of three-quarters of a year, until at last it found here a preliminary object, and the statistics alone can give an idea of the immense amount of products of all lands, which are unloaded in this harbor, and stored in the enormous magazines. The harbor-basins, where those store-houses are situated, are crowded with boats for unloading the wares, give a refuge to colossi of ships; here the steam-whistles resound; columns of smoke rise to the sky; chains are rattling and cranes are creaking. In those long, extended buildings, which are almost as large as a country town, the merchandise is stored, free of duty until it is put in the market. Oil, wine, tobacco, silk, wood, flour, etc., etc., are stored

in innumerable vaults, in the six stories of the monstrous buildings. Steam is in operation to unload the ships, and small railroads allow the wares to be easily transported. The principal of these store-houses are the Catharine-docks, which are easily to be reached from the Tower. It is only separated from this gloomy witness of the reign of tyranny of the Middle Ages, by a street, and here one is astonished at the hubbub which is going on. These docks were opened to the traffic in 1828: in former times, one thousand two hundred and fifty houses, with eleven thousand three hundred inhabitants were found there. The flood-gates which lead to the basin are so deep that, at the time of tide, ships of seven hundred tons (one ton equals forty-two cubic feet) can easily enter and leave. The store-houses have a capacity of one hundred and ten thousand tons. The Catharine steamboat-wharf is especially used as pier for the steamers which come from the continent. A whole series of docks is connected with the Catharine-docks. Among them are the London-docks, with room for two hundred and twenty thousand tons of goods, and a cellar with a capacity of eight million two hundred and twenty-five thousand gallons. The tunnel of the Thames leads from that part of the city which is south of the London-docks, two miles below London Bridge, to Rotherhithe, which lies on the right shore of the Thames.

The Thames flows through the city of London, and divides it into two parts. Many bridges span the river, but they are insufficient in number for the great traffic, and the idea was entertained of constructing a new bridge. It must be so constructed, however, that the largest vessels could pass under it. In order to avoid this, Vesey commenced, at the beginning of this century, to build a tunnel under the Thames, which plan, although it was nearly executed, had to be relinquished in 1809, on account of too many obstacles. In the year 1823, the idea was revived. The French engineer, Isambert Brunel, looking at the keel of a ship, saw how the worms hollowed out their single passages into the ship, by corridors closely adjoining each other, and conceived the idea that a great

tunnel might be constructed by proceeding in the same way. He had twelve boxes made without bottom, such as are used for a foundation for water-works. These frames he placed perpendicularly, the one next to the other, and divided each in three parts, by means of traverses, so that he had, in all, thirty-six divisions, which served as points of commencement for the excavations of so many single shafts.

Each one of these divisions was designed for one laborer; it was open in the back and in front, supported by many planks, which were movable. All the frames together were called the shield. This shield was placed before the portions of ground to be excavated; the laborer removed one of the planks, and commenced digging, placed the plank, afterwards, against the sides of the shaft, which had been digged, and supported it in this position by heavy poles; the work was continued in the same way. As soon as the laborer had advanced to the same length in all the three divisions of a frame, it was pushed forward by two dummies, one of which worked at the top, the other at the bottom, into the excavated space.

As soon as the frame had advanced, masons commenced vaulting immediatety behind the laborers; the shield, however, protected the earth until the vaults were ready, and the rolls, which now had been built, in their turn served as support for the dummies, by which the single frames were pushed forward. To this so simple means of excavating, London owes her underground railroad, which had long been considered as a work impossible of achievement.

In the year 1824, an action-company was formed for the restoration of the tunnel, and soon the only point where such a work could be commenced, was found. It was between Rotherhithe and Wapping, between London and Greenwich.

At this point, the shores of the Thames are one thousand one hundred and forty-four feet apart. The construction was commenced, in 1825, by building a cylinder of brick on the side of Rotherhithe, at a distance from the water of one hundred and fifty-five feet. This cylinder was forty-three feet high,

half a foot thick, and had a diameter of fifty-three feet. Over the upper opening, Brunel placed an engine of thirty horse-power, which took the earth and the water from the interior, until, in that way, the cylinder had sunk sixty-six feet deep into the earth. Now he placed a second cylinder within the first, which had a diameter of only sixteen and one-half feet, and sunk it, in the same manner, eighty-two and one-half feet deep. The tunnel now commences from the first cylinder, at a depth of sixty-two and one-half feet; its breadth is thirty-nine and one-half, and its height twenty-three feet, the wall inclusive. The section is formed by two ovals, which touch each other; in that way, two vaulted corridors are made, each of which is almost sixteen and one-half feet high, and has a road for carriages, and one for pedestrians, the one next to the other. Both corridors are united by openings, in which are gas-lights, which lighten them both.

At the beginning of 1826, they commenced the horizontal labor for the tunnel proper, from the bottom of this shaft. They soon came, from a firm, clay soil, to a loose, moist layer of sand, but, some time afterwards, clay was met with again. The construction progressed slowly but steadily; every day two feet were accomplished. On the 20th of June, 1826, the construction reached the bed of the river, and on the 2d of March of the following year, they had advanced four hundred and seventy-five feet, or almost one-third of the length of the tunnel had been completed.

Although the tunnel was constructed with such a decline that at every three hundred and thirty feet, it inclined almost nine and one-half feet, the top of the tunnel approached, at the middle of the river, the bed, by three meters. Till now, every thing had gone on very well, although the obstacles and dangers for the laborers increased the more they approached the bed of the stream. Brunel did not lose his courage, and the increasing danger more than once imperiled his life. With the purpose of examining the bed of the Thames, himself, he went down into the deep with a diving-bell, on the 22d of April, 1827, which bold undertaking he repeated for several

days. He found, at several points, the reason why the water trickled through, and, consequently, he sunk there several baskets and bags with clay and lime.

He purposely dropped several tools, shovels and a hammer, and when the laborers, a few days afterwards, digged out in the tunnel some watery substance, they found every one of the tools. So these tools had worked through the sand and mud beds of twenty-nine feet of the Thames, and to the depth of the tunnel; a very bad indication of the loose substance of the soil. However, the labor was continually pushed forward, when, unfortunately, several large vessels, which had drifted down with the stream, threw their anchors exactly over the tunnel. The consequence was such a violent rush of the water of the Thames, that the engines could not master it longer. All efforts were in vain. The laborers saved themselves, the tunnel was filled, within a quarter of an hour, with water and some thousand tons of sand and mud. This happened on the 18th of May, 1827. Brunel did not lose his courage. Again he went down, in his diving-bell, to the hole which had been made, and, to his great joy, he saw that the masonry had not been harmed, and his shield stood on the same spot where the laborers had left it. He commenced, at once, to repair the damage. With sixty thousand hundredweights of clay, let down in baskets, he filled the hole, and pumped the tunnel dry with several engines. A month after the disaster, the work went on again. This accident, however, seemed to be the beginning of a series of misfortunes, which threatened the continuation of the tunnel. The laborers had lost their courage, by the last disaster, which had almost proved fatal to them. One cry of alarm followed another, when masses of combustible gas filled the interior, and, at the least carelessness with the lamps, exploded, and filled the whole empty space with flames and such a terrible stench that the laborers swooned. However, up to the 12th of January, 1828, they had advanced fifty-three feet farther, when the flood broke, for a second time, through the ceiling. This unfortunate incident was paid for by the lives of six laborers. The

son of Brunel was, at that time, in the tunnel; he crept forward, blindly, in the space, which was blacker than night, then the current of water took him up, but, happily, it forced him up into the shaft. This second hole was at a distance of six hundred and twenty-seven feet from the entrance. Again, Brunel went down to the bottom of the river; the tunnel was pumped dry, and it was proved that the masonry had not been damaged.

Now the means for continuing the work commenced to give out, and it was interrupted for seven years. At last, the government supplied the means for its completion. The work commenced anew, but it proceeded very slowly; the bed of the river proved to be so soaked through that a new bed had to be formed; the shield, which, till now, had been used, was damaged, and had to be replaced by another. Three times, again, the water forced its way through the ceiling. However, the work went on, amid the uninterrupted struggles with the obstacles of the soil and the elements, and on the 13th of August, 1841, Isambert Brunel had the satisfaction to walk through the whole length of the tunnel, after continuous struggles and labor of sixteen years! After the entrance and exit of the tunnel had been constructed, the tunnel was opened, with great festivities, for the general traffic.

The gigantic labor took three million five hundred thousand dollars. Everybody passing through it has to pay one penny.

Brunel, the able architect, was made a baronet, by the queen. He died in 1849.

The tunnel, in the beginning, paid so little that those who held bonds were obliged to pay for a part of the repairs, but, in 1865, the tunnel was bought by the East London railroad company, for two hundred thousand pounds, and at the present time, forty railroad-trains are going up and down under the water of the Thames, and effect the communication between Wapping and Rotherhithe, where the great Commercial- and West India-docks are found, which are the greatest in the world, and which have room for four hundred and fifty West Indiamen.

The underground railroad in London is the most remarkable one on the globe, as its rails are laid almost entirely in tunnels. It was opened in January, 1863, and was built by the civil engineers, J. Fowler and Mason Johnson, with the purpose of connecting the four most important railroad stations on the north side of the Thames. It commences at the last station of the Great Western road, and terminates in the City. The road has six or seven halts, and is laid above the ground only, where the lots lying in the line of the road, and the buildings on them, could be cheaply purchased; for the greatest part, however, the road is underground, and leads through tunnels, which are lighted by gas. The stations have platforms of a length of two hundred and five feet, and a breadth of ten feet.

The road follows, with its double track, the direction of the streets; it curves, however, considerably, to such an extent, even, that in a distance of four English miles, mostly underground, it makes a curve, the diameter of which is six hundred and twenty-seven feet. The tunnels, constructed with an elliptic section, are about twenty-nine and one-half feet wide, and sixteen feet high. The walls are all twelve inches thick, and built of brick with hydraulic lime, on account of the moisture. The greatest ascent of the road is one foot per hundred, and the greatest depth under the surface of the earth, fifty-six feet. Good light and sufficient ventilation is not wanting, and the new locomotives, which consume their own steam and smoke, prove to be a perfect success. The stations of Baker street and Gower street, have a peculiar system of illumination. Fourteen enormous windows open on both sides of the immense, dark vaults. The daylight, which they allow to enter, falls on a perpendicular wall of white, polished tiles, and is reflected through the windows proper, sidewise in the halls. Nevertheless, the light is only feeble, gloomy, and vague. The real sun of London underground is gas. Even the passenger cars are provided with it. From six o'clock in the morning, till after midnight, a train goes up and down every twenty minutes, and the charges are less than those of the omnibusses.

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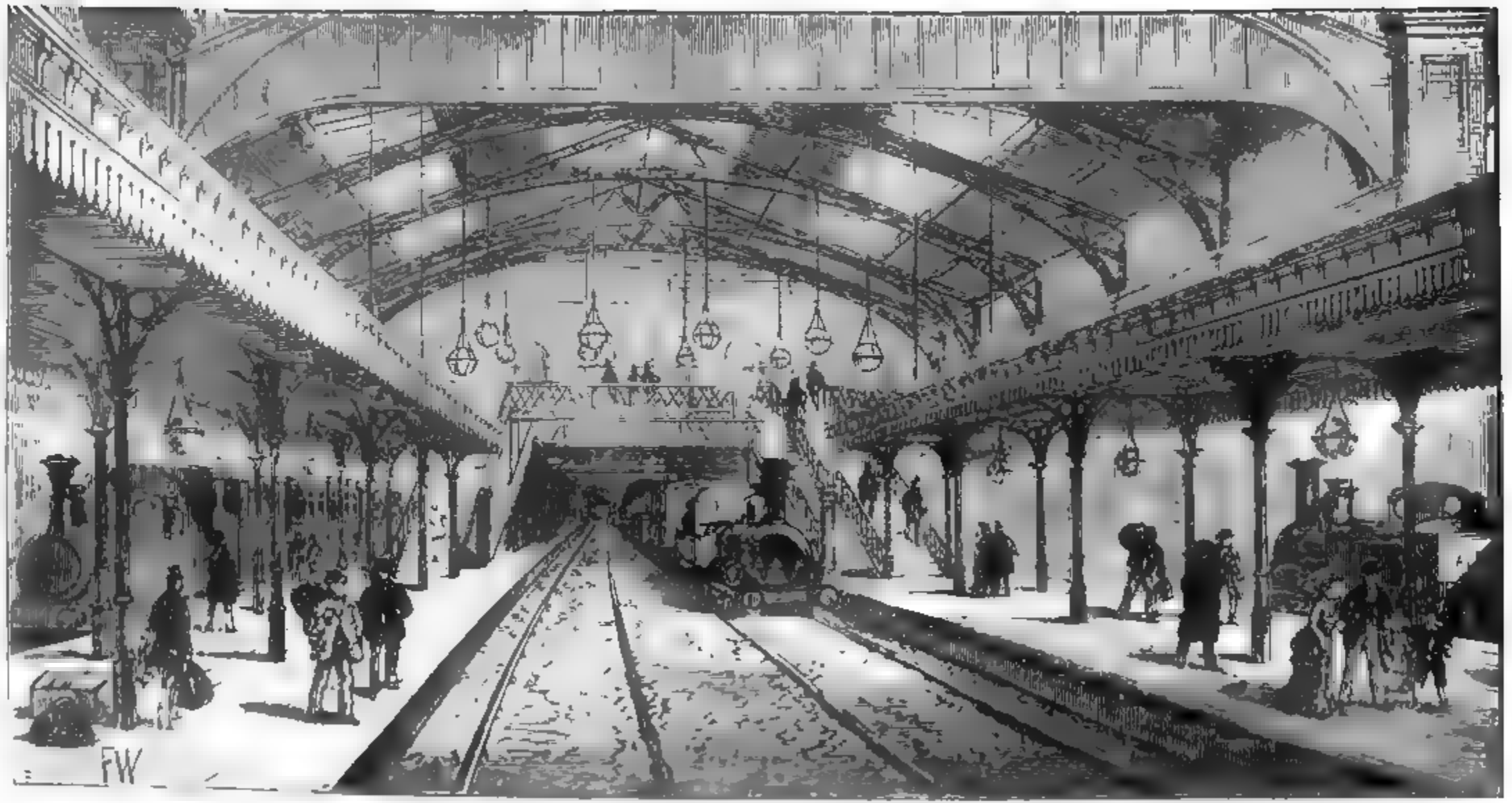

UNDERGROUND RAILROAD STATION, ALDGATE, LONDON

The road has cost about one million one hundred and twenty-five thousand pounds, for the construction proved to be a very difficult one, as well on account of the water-works, gas-works, etc., which of course had to be avoided, and which often suddenly presented themselves as obstacles, but also on account of the unstable nature of the soil, which necessitated very expensive constructions.

Lately, the underground railroad has been extended, and the new Aldgate station has been opened to the public.

Although this extension amounts to only half a mile in length, it has involved great expense, because of the remarkable engineering works that were required, for example, the walls of some of the immense tea warehouses of the St Catharine Dock Company, eighty-six feet high, and four feet thick, had to be "underpinned," and deeper foundations put in for them; but this work was successfully carried out without the slightest injury to the buildings. In spite of all obstacles, the diversion of nine great sewers, and the construction of a large sewer, five feet by three feet, beneath the rails along the whole length of the line, the works have been promptly completed. The excavations were just outside where the old City walls stood, and a few Roman relics were found. Outside the new station, twenty feet below the surface, was discovered an immense deposit of bullocks' horns, cartloads of which were removed and sold. No other bones were with them, and how they came there in such numbers is a mystery.

There are plenty of openings for ventilation along the new line. Aldgate station is the lightest and airiest station along the line. The glass roof extends half the length of the platform; the other half length is covered by narrower roofs, supported on wooden pillars rising from the platforms themselves. The front of the station is in High street, Aldgate, a door or two from the old church of St. Botolph, and opposite to the Minories.

Entering the station-building on High street, the visitor passes by easy steps down the landing, thence by the stairs to whichever platform he desires to reach. The situation of the terminus is

most convenient, and will bring the company a large amount of business. Within a short distance, are the London and the St. Catharine's docks, Fenchurch and Leadenhall streets, the Commercial road, and the densely populated neighborhoods of Whitechapel and Towerhill. Thus the eastern extremity of the City, and the best business parts of the East End, will be brought within a few minutes' journey of Holborn and the West End of London, the Great Northern, Great Western, Midland, and Chatham & Dover Railways. The increase in the fares to Aldgate will be only a penny per ticket. All the trains of the Metropolitan Railway Company will run through to the new station, except the Great Western mainline trains, which are few in number. A marble tablet in the Aldgate station records the fact that this extension of the Metropolitan Railway was commenced on March 1, 1876, and gives the names of Sir Edward Watkin, chairman of the company, and his fellow-directors; the general manager, Mr. Myles Fenton: Mr. Brady, the engineer; and Messrs. Lucas and Aird, contractors.

During Sir Edward Watkin's visit to New York, a few months ago, he gave some very interesting particulars concerning the operation of the rapid-transit railway system of London.

The London underground railroad companies, he said, already had about sixteen miles of road in operation, and in a few months they would have twenty miles of completed road. They were negotiating for a still further extension of their routes, and would in time burrow under the whole city of London. These roads had proved to be a greater convenience to the poorer classes than to wealthy persons. The average fare collected was five cents, and the rate per mile was reduced, by a system of commutation, to one penny. These roads carried seventy million passengers a year. Heavy locomotives were used, and one thousand trains per day, each having a carrying capacity for one thousand persons, were run over them. The rate of speed was very great. The cost was five million dollars per mile, of which about four-fifths was due

to damages to real estate caused by cutting through blocks of buildings and tunneling under houses. In some places the roads ran under graveyards without disturbing the graves and the vaults above.

This enormous cost for land would be wholly saved in New York, because here the railway lines would be longitudinal with and run directly under the main streets, without invading private property. But in London, owing to the formation of the city, the underground roads pass athwart the streets and cut through private property in all directions. The citizens of London have ascertained, by practical experience, that the underground system is the best, have invested in it upward of eighty millions of dollars, and are annually increasing the investment and extending the works.

Sir Edmund said that ninety-three per cent. of the passengers on the London underground roads traveled only short distances, and only seven per cent. of them were carried to the end of the various routes.

The underground line is admirably managed, the only objection to it being the overcrowding of the carriages. A London man once said to us: "I can very seldom get a seat in a train, when I travel on it, not because I am so big, but because the other fellows take up all the room. This overcrowding is a great inconvenience to ladies, who use the railroad quite as much as the other sex. It serves them in their calling or on shopping expeditions, in lieu of cabs or omnibusses. The last report of the underground railroad presented to the share-holders shows that the number of passengers carried, during the last half year, was twenty-six million two hundred thousand, which seems an enormous number, nearly fifty-two million five hundred thousand per year. One would suppose that with such patronage the road must pay.

The most remarkable feature of this new work is the fact that a considerable portion of the line is built under water. The commerce of the world may be said to float and navigate directly over a part of the roof of the tunnel, which

extends southeasterly, from the Liverpool street station of the Great Eastern Railway, passing directly under the warehouses and water-basin of the London-docks, thence under the embankment, across and under the Thames river, to the New Cross station of the Southeastern Railway, thus connecting all the roads named, and also the London & Brighton and South London lines. At Shadwell and Whitechapel, magnificent stations, each four hundred and fifty feet in length, have been erected. The total cost of this new line, which is a little less than six miles in length, has been three million two hundred thousand pounds, or sixteen millions of dollars. Of the advantageous nature of this line to the public, the London papers say there is no doubt. That portion of the line under the Thames passes through the old Thames tunnel, built by the celebrated engineer, M. I. Brunel. This work, of which I spoke before, never proved of much value to the public until brought into use several years ago as a railway tunnel.

XLVI.

DUNGEONS.

LIFE IN THEM. — ANCIENT DUNGEONS. — THE PRISON OF ST. PAUL. — THE DUCAL PALACE. — "SOTTO PIOMBI." — THE POZZI. — SHUT UP IN THE DARK CELLS. — A NIGHT OF HORROR. — A GUIDE'S BLUNDER. — DUNGEONS OF ST. PETERSBURG. — PETER THE GREAT TORTURING HIS SON. — A PRINCESS DROWNED IN PRISON.

A GREAT many people have at some time in their lives been in dungeons; some of their own accord, and others much against their wills. Those who have gone there voluntarily rarely stay long, as their visits are made out of curiosity; and curiosity in regard to dungeons is very speedily satisfied. I have been in a fair number of dungeons, but I generally made my way out of them with very little delay. They are not very agreeable places of residence; and if one of them were assigned to me as a spot to dwell in, I should get out at the earliest moment, when it was in my power to do so.

A dungeon is an old-fashioned institution, but it is not altogether out of date. If the history of all the dungeons in the world could be written, there would be many startling tales narrated, and many volumes could be made concerning what has transpired within them.

In the days of the ancient Romans, every emperor of good and respectable standing kept a private dungeon for his own use; and he had a good many public ones lying round loose for his friends to occupy. Some emperors kept their dungeons well stocked at all times, with an assorted lot of humanity. They were not particular as to age or sex, as long as they could have their dungeons liberally patronized. Nero did a fine business in the dungeon line, and successfully rivalled many of his competitors. He displayed great ingenuity in starving

his prisoners, and occasionally in putting them to death; and so did others of the Roman rulers. Nero was a festive old fraud, and did not mind putting his friends to a good deal of trouble in order to amuse himself. I have elsewhere alluded to his fine array of gridirons, toasting-forks, racks, and thumb-screws with which he used to get up exhibitions of a very select character.

Many of the old dungeons are now closed, partly for want of business, and partly for the reason that their present proprietors have a delicate regard for the reputation of their ancestors, and do not wish any prominence given to these old prisons. Other dungeons are kept open to visitors, but nobody is confined in them. One of the most celebrated dungeons of Rome, for instance, is that in which St. Paul was involuntarily lodged during a part of his stay in Rome. There are two dungeons, one below the other: the upper one is not altogether uncomfortable, though its space is rather restricted, and does not afford much room for exercise.

When I visited this place the guide pointed out several of its peculiar features: one of them is an impression of a human face in the solid rock, at the side of the staircase; and he related, with great solemnity, that while St. Paul was being led down the stairs his keeper pushed him, and pressed his face against the stone. An ordinary face, he explained, would have been injured by the operation, but a miracle was performed, in the instantaneous softening of the rock, so as to receive the visage of the apostle without injury. The impression thus made remains to this day.

Another curious feature is the spring of water from which St. Paul baptized one of his jailers. It is related that one of the jailers became converted, and desired Paul to baptize him. No water was at hand for the purpose; but a miracle was performed, by the opening of the rock in the floor of the dungeon and the appearance of a spring of water. This spring remains at this day, and contains water apparently fresh and sweet. The keeper of the place dipped a quantity of the water from the spring, and offered it to our party for drinking.

We were about to drink, when the guide who accompanied us shook his head, and intimated that the liquid was not good. We did not taste it; and therefore I cannot speak positively as to its character. A picture has been painted, and is preserved in the room above, showing the miraculous opening of the floor, the water rising like a fountain from the rock, and the apostle engaged in the act of baptizing the jailer, who is kneeling before him.

In the middle ages every owner of a feudal castle had a dungeon about his premises, though it was not always under ground. Sometimes it was hewn out of the solid rock which formed the foundation of the edifice, and sometimes it was in a high tower placed at one corner, where the occupant could look out and enjoy the scenery, though he was debarred from any practical knowledge of it other than what he could obtain through his eyes. Many a person has lived and suffered for years, shut up in a high tower where he could look out on the world around him with the consciousness that he was never more to enjoy his liberty.

The Ducal Palace of Venice was well provided in the dungeon line. There were prisons under the roof of the palace which were known amongst the Italians as the "Sotto Piombi," or "Under the Leads." They were so named from their position, directly under the roof. They were hot as ovens in summer, and as cold as refrigerators in winter, and they were connected with the room where the famous Council of Ten used to sit. From these prisons persons accused of crimes against the republic were taken before the Council, whose members sat with their faces covered with masks, and their bodies wrapped in cloaks and mantles, so that it was utterly impossible to identify them. To be dragged before the Council was equivalent to a sentence of death: and generally the trial of an offender would be very brief.

Any one could make an accusation against a person, who would be speedily arrested and taken to trial. He never knew who were his accusers; and very often he did not know what testimony was to be given against him.

From the Council Chamber he was generally taken to execution, though not always; in either case he was led across the famous Ponte di Sospiri, or Bridge of Sighs; and according to tradition the bridge received its name because prisoners, weeping and sighing, were led across it for execution, or were taken from the prison for trial before the Council of Ten.

Byron has written,—

> "I stood in Venice by the Bridge of Sighs,
> A palace and a prison on either hand."

Between the Ducal Palace and the prison proper of Venice there is a narrow canal. The bridge is elevated far above the water, and has two passages, each about four feet in width. In regard to these passages traditions differ: one tradition is, that the two were designed, one for noble prisoners, and one for plebeians, while another says that they were used indifferently, patrician or plebeian being allowed either passage without regard to the rank or position he held. The reader can accept whichever explanation suits him best.

Down beneath the palace was a real dungeon: it could never have been an inviting place, and it is very far from being so at this day. No effort is made to keep it in fine condition: it is not carpeted; its walls are not painted, neither are they frescoed. I remember on my first visit that, after we had wandered through the palace, our guide descended a series of stairways, and finally brought us to a place below the level of the water which surrounds Venice. "Here," said he, "are the dungeons; and here is where many state prisoners, who offended the laws of Venice, passed the portion of their lives immediately preceding their deaths. You can enter them, gentlemen, and see how you would like them."

Torches were lighted, and we told the guide that we preferred to follow him. On we went, where not a ray of light from the outer world could reach us. Had our torches been extinguished we should have been in darkness as deep as that of the lowest and most elaborate mine in the world. It

did not require a vivid imagination to roll back the centuries, and bring before us the thousands and thousands of men who had lain there, day after day, without hope, until led to trial, and thence to execution. What a world of mystery lies concealed in these prisons! Here is the cell where Marino Faliero was confined; and here is the cell where Jacopo Foscari passed the days preceding his execution; and here is the cell where dozens of men of noble birth and gentle rearing were kept day after day, till they died of starvation and for want of fresh air. The cells are little boxes, some of them not more than six or eight feet square, and not high enough to allow a tall man to stand erect. One cell is only four feet high; and it was said that a healthy man confined in this cell generally died on the sixth day, owing to the dampness and impurity of the air he was compelled to breathe.

To have a practical realization for a few moments of the horrors of imprisonment, we entered one of these cells, and told the guide to take away the torches and not to return for five minutes, whether we called him or not. He went away; the air had been chilly, damp, and disagreeable; and it seemed ten times more so as the light disappeared. The darkness was of the intensest blackness; we could not distinguish anything. With our faces turned towards the door of the cell it seemed the same; the finger held an inch before the eye was no more visible than if it had been cut off and buried a hundred feet deep in the earth.

One minute was quite enough of this sort of thing, and we were inclined to shout for the guide, when we remembered that we had told him to get out of hearing, and not to return even if we called.

I almost expected the ghost of one of the departed occupants to rise before me, and add to the discomfort of the occasion. A ghost is bad enough anywhere; but I always prefer to encounter him above ground, and where there is, at least, enough light to enable me to see him. Had one of those gentlemen made his appearance, it would have been necessary for him to bring a lantern, or rub his unearthly limbs with phosphorus, to enable us to see him.

But no ghost made his appearance, possibly for the reason that the body in the flesh had had quite enough of that place, and had no wish to send his shadow back again. The five minutes' absence of the guide seemed at least an hour, and when he returned we welcomed him with all the enthusiasm with which we would have welcomed a brother from whom we had been separated a dozen years. We told him that we thought he had been away much longer than the time stipulated, but he assured us he had not.

On narrating this incident afterwards to a party of gentlemen in Paris, I was told of a similar experience, only a great deal more so, of a couple of travellers, one an Englishman and the other an American, who tried the experiment which we did. It seems that the men wished for a little taste of imprisonment, and sent away their guide for half an hour.

It happened to be near the close of the day. Their guide was a stupid fellow, and thought he would improve his thirty minutes by retiring to a *Trattoria* to indulge in a bottle of cheap wine. So he came out of the palace and crossed the Piazzetta San Marco to a restaurant near the corner of the piazza. He took his wine, indulged himself for about twenty minutes, and then started on his return. He had not observed the hour of his departure from the palace, and when he returned to the entrance he found it closed. It was the time for closing, and the persons in charge of the premises had shut the doors and gone away.

Here was a predicament. He had left the two gentlemen down in the dungeon in total darkness, where he could not reach them, and where their shouts could not be heard. He tried to obtain an entrance to the palace, and to explain the matter, but the porters were obstinate, and did not believe his story. Italians are very suspicious, and the custodian of the palace suspected that he wished to get inside in order to steal something; so they turned him away, and he walked off sorrowing.

It was during the time Venice was under the rule of Austria. The Austrian officers were never inclined to show

favors to the Italians, and consequently the appeals
he guide to those in charge of the city were of no avail.
finally, with Italian resignation to what could not be very
l helped, he went home, wrapped himself in the bosom
ıis family, and slept the sleep of the innocent and con-
ntious.

leantime the two travellers were having a good time of it
'n below. They stood it for a while very well, but the
' hour appeared to them three or four times what it really
. Very soon the thing ceased to be a joke. They were
l aware that the time might seem long to them, but they
ıght it was stretching itself out altogether too much for
ıfort. They were in a cell where they could not walk
ınd, and where there was no chance to kill time by turning
ımersaults or playing leap-frog. They stood a while and
ed; then they stood a while and swore; and then they
another period of standing still and shouting. The
lities for standing still were unlimited, but those for doing
thing else were very much restricted.

'hey shouted themselves hoarse, and obtained no response.
: result of their swearing was pretty nearly the same.
:y began to grow hungry and thirsty, but there was noth-
to eat, and there were no materials at hand for quenching
r thirst. The half hour extended to an hour, and then to
hours, and then they concluded to sit down and wait for
fellow to come back. They had no means of knowing
' time was passing, as their watches were not of that
uliar kind that strikes the hours, and tells you how you
getting along.

hey listened and listened, and finally they heard sounds;
they were not welcome ones, as they were caused by the
that ran about the place. The rats seemed to have a
lness for the dungeon. They did not make much noise, and
ld only be heard when the strangers were perfectly still;
there they were in goodly numbers, and their presence
not consoling to the travellers.

rom hungry and thirsty they began to grow sleepy, but the

facilities for sleeping were not good. The furniture of these prisons was never elaborate, even in the days of the glory of Venice. The rulers of that city never thought of providing their prisons with upholstered sofas, and four-post bedsteads. The furniture generally consisted of a bundle or two of straw, and possibly a chain. Sometimes a stool was added, but it was a luxury which every prisoner did not possess. There was neither straw nor sofa in the cell at the time these unhappy travellers were shut up there, and consequently, if they wished to sleep, they must lie down on the bare floor of stone and hard earth, at the risk of taking cold and spoiling their store clothes.

They compromised the matter by sitting down in the corners and taking occasional winks of sleep. Their slumbers were not of long duration, and were interrupted by the rats running over them, and making themselves remarkably free, considering that they had never been introduced.

Hour after hour passed away. One of the men said, "it seemed as if we were shut up a full month; and," said he, "I suppose if I had been alone it would have seemed to me about six months."

Finally, in the morning, as soon as the palace was opened, the guide returned with his torches, and rescued the prisoners from their confinement. He tried to make them believe that he had only been gone about half an hour, and he almost convinced them of the truth of his averment, by proceeding to show them, in a very mechanical way, the other curiosities of the place, and to tell them it would soon be sunset, when he would go home and prepare to show them the way to the theatre in the evening. He told them, "I suppose, gentlemans, it seemed to you as if you were there a good many hours. It always seem so to gentlemans; they say so always."

The travellers admitted that it did seem as if they had been there a good many hours; and as they came up stairs, saw the sun rising, and saw the movements of the people indicating that it was morning, they perceived how they had been

treated. Without heeding the request of the guide to be paid for his trouble, they kicked him from the door of the Ducal Palace half away across the piazzetta, and left him to go home without any fee for his day's services, and with the impression of an English and an American boot painfully evident on his person.

On the banks of the Neva, in St. Petersburg, there are some famous dungeons in which prisoners of state have been confined. Peter the Great ordered one of his sons imprisoned there, and treated him with great severity. Peter was a hard-hearted monarch, and with his love for Russia, he was as ready to visit punishment upon the members of his own family as upon any one else. The Empress Catharine is also said to have shut up some of her relatives in these prisons; but her cruelty never quite came up to that of Peter, who is said to have caused his son to be put to torture in his own presence, and to have stood calmly by and witnessed his dying agonies. But then she was a woman, and a good deal must be allowed to her in the way of womanly feelings.

A pleasant feature of these dungeons at St. Petersburg is that they are located under the level of the river. St. Petersburg was built originally on a marsh. There is not a hill in the whole city, and the level of the street is only a few feet above the banks of the Neva at high-water mark. Once or twice in a century, the city is inundated, and in such cases the prisoners in these underground cells are quietly drowned; at any rate, such has been their fate on two or three occasions. It is true they might have been saved, had the officers in charge of the prison been willing to open the doors, and allow them to leave their cells; but no one thought of an inundation, and as the prison-keepers had strict orders to keep the prisoners in their cells, unless otherwise commanded by their superiors, and as the superiors were away at the time of the flood, the poor victims were drowned like rats in cages.

There is a thrilling story about one of these dungeons, or rather about one of the prisoners confined there.

A Russian adventuress, said to be a princess, of great

beauty and accomplishments, about the year 1822, was in the south of Europe, and claimed a relationship to the emperor's family. Some persons at this day insist that her claim was well founded, while others say that it was purely fictitious. At any rate she made a great stir, and created so much trouble to the emperor and the Russian government, that an attempt was made to bring her back to the empire, where she could be properly dealt with.

Various traps were set, and various plans were laid, but none of them were successful, until one day — I think it was at Genoa or Leghorn — she was invited to visit some ships lying at anchor in the harbor. A party had been made up, and every one, including the princess, whose name I do not now recall, had partaken liberally of champagne.

A Russian officer in civilian dress was of the party, and adroitly managed to induce her to go on board a Russian ship of war then in the harbor. The instant she touched the deck the anchor was lifted, and she was invited below. The rest of the party were put ashore, and the ship sailed for Cronstadt.

She was kept in close confinement during the voyage, and on her arrival at St. Petersburg was consigned to one of the dungeons. There she was kept a close prisoner in the hands of the government to which she owed allegiance, and which she had deeply offended. While she was still in this dungeon there came the great inundation of 1824. The prison where she was kept was flooded, and the unhappy princess was drowned.

I heard the story of her unhappy fate while in St. Petersburg, and afterwards in Paris. It was recalled to me in the latter city by a painting in the Russian department of the great Exposition of 1867. The most attractive picture in the Russian collection was the one which represented her death. It was not a large picture. but fearfully realistic in its character.

It showed the interior of her cell, and the torrent of water flowing in through a small grated window near its roof. It

was pouring in like a miniature cascade. It had covered the floor up to the very edge of the rude pallet which formed her bed. Its sheep-skin covering was hanging over its edge; rats by the dozen were climbing up this coverlet and crouching around the unhappy woman, who knelt on the couch, her hands clasped, and her face turned upward. There was a dim light in the cell, just enough to render the scene as gloomy as possible. The attitude and features indicated agony and despair at the nearness of a horrible death, from which there was little hope of relief.

XLVII.

ANIMALS UNDER GROUND.

HORSES IN MINES. — EFFECT OF AN EVEN TEMPERATURE ON HORSES AND MULES. — EFFECT OF DEPRIVATION OF LIGHT. — WALKING IN DARKNESS. — RATS IN MINES. — A MONKEY IN A SILVER MINE. — THE CONSTERNATION HE CREATED. — WHAT HE WAS SUPPOSED TO BE. — HIS UNHAPPY FATE. — A MONKEY AT SEA. — HIS PRANKS. — DEMOCRATIC HABITS. — HOW HE LOST HIS LIFE. — HIS LAST PERFORMANCE. — DOGS IN MINES, AND THE EFFECT OF UNDERGROUND CONFINEMENT. — JOY AT REACHING DAYLIGHT AGAIN. — TWO DOGS AT SEA, AND WHAT THEY DID. — A DOG SAILOR, AND WHAT HE DID. — HIS UNHAPPY END.

As a general thing, miners do not devote much of their time under ground to the care of pet animals. The horses and mules that are kept below are not regarded as pets, but as a part of the working force, and are required to do their whole duty. They are cared for just as well as animals of their kind in similar occupations above ground. Their stables are comfortable, and from their location the beasts can hardly be expected to suffer from cold, though they may sometimes find the heat rather severe. In many localities horses and mules that have been kept a long time under ground, in an unvarying temperature of seventy degrees or more, lose their hair, or a large portion of it. They never suffer from rain or snow, because there can be no storms hundreds or thousands of feet under ground; and they need no protection against cold where there is no cold. Sometimes they become blinded from constant deprivation of the light of day. They very soon learn to walk along certain ways and levels in complete darkness, though they manifest a decided preference for light rather than for its opposite.

The presence of rats in mines has been referred to elsewhere. In some mines they are rarely or never seen, while

ers they are numerous. The facilities for good living
:s are not abundant, and they certainly have small en-
gement to stay in the levels and tunnels, when they
do much better, and live much happier, above ground.
ally they have no means of exit, as they cannot easily
; of the shaft; and the shaft is the only means of egress.
ıce heard an amusing story of the consternation created
ine by the introduction of a monkey. Somebody con-
l with the place had in a mysterious way become pro-
r of a monkey, and one day he took the beast with him
he mine. The monkey made no objection to going
but after reaching the tunnel where the men were at
he became alarmed, and ran about very uncomfortably.
ent from one place to another, attracted by the light,
hopes of finding a friend. Many of the men had never
, creature of his kind before; some thought it was the
as they could not imagine what else it could be, and
thought it an enormously overgrown rat.

of the men was lying on his side, digging away at the
f a vein of coal. The monkey thought he recognized in
an a friend, or somebody who ought to be a friend, and
for him. The man knew nothing about the presence of
ast until the latter scrambled upon him and looked full
face. The miner gave a scream, and fainted. Such a
ad never before been turned towards his own, and his
was not at all surprising. The monkey left him, and
prang among a group of men who were loading a car
l. They stopped work, and shouted to their comrades
ıe devil was in the mine. In fact, within fifteen min-
hat single animal had created an alarm among the men
as not quelled for two or three hours. The beast finally
the shaft, made a leap into the darkness, went down
undred feet or more, and struck upon a pile of coal. As
key, he was not of much consequence after that.

ressions are permissible in a popular work of this kind,
take the liberty of giving a story of a monkey, which
ld me quite recently by an eye-witness of his pranks.

"I was sailing as an ordinary seaman at one time on an American man-of-war. There were about five hundred men on board, and sometimes there was very little for us to do. Out in the East Indies, at one of the ports where we touched, we picked up a lot of monkeys. They belonged to the officers, but somehow the monkeys preferred to associate with the men. They had the free run of the whole ship, and did pretty much as they liked. They used to steal everything they could lay their hands on, and for a month or two the sailors had very little to do except playing with them.

"When we got out to sea, nearly all of the brutes died. We sailed up north in the Pacific Ocean, and it got rather cold. One monkey had brains enough to hunt out a warm place, and went down into the engine-room, where he used to sit and look at the stokers stirring up the fires. He would sit there, and make faces at them; and one of the officers said that the monkey, if he had any idea of a future state of existence, must imagine that he was in a sort of purgatory, and that the stokers stirring up the fire were keeping it hot for roasting a lot of fellows who were expected to arrive. He managed to live until we got back into the tropics again, and then he came out of his hiding-place, and used to go round among us as sociable as ever.

"He wasn't an aristocrat, that monkey, and didn't seem to have any high notions about society. One hour he would be in the cabin with the captain, and the next thing you would hear of him, he would be in the galley, making friends with the nigger cook. One day he took the cook's cap, carried it into the cabin, and put it on the captain's head. The captain did not like that sort of familiarity, and he ousted the beast from his cabin. He was constantly kicking up a row everywhere, but he was such an amusing duck that everybody liked him.

"When we were lying in the harbor of Nagasaki, we opened our gun-ports, just as we always did when at anchor. One of the favorite jumping-places of the monkey was to go from the end of a yard down to the port on the starboard bow.

and whenever they were chasing him, he would be sure to make in that direction. One day we got up steam, and prepared to leave; and of course our ports were then triced up. Just as we were starting, the monkey was full of play, and made for his favorite jump. He did not stop to see that the port was closed, and that in the place where he jumped there was nothing for him to light on; so down he went into the water. We threw a rope over the side of the ship, and he caught hold, and climbed up. He was always mighty careful after that about his jumping-place.

"Occasionally, when we were lying idle, and everybody was tired, the officers would get up a purse of five dollars, and then pipe the men to catch the monkey. The monkey would start up the rigging, and the men would go for him, and the first man that got him would have the money. You see there would be over four hundred men in the rigging. The monkey could jump and run much better than they could, but they were so thick that almost everywhere he went he was in danger of lighting on a man. He seemed to enjoy the fun just as much as anybody else, and he would make a lively race all over the rigging. Sometimes he would go clear up to the main truck, and sit on the top. It was rather tough work to get him there, and it was no use climbing for him, because before a man could get hold of him he would be sure to jump somewhere else. So we had a rule, that when he got there, we tried to shake or frighten him off in some way; and if he was caught in that jump, the catch did not count.

"We had lots of fun that way. The officers would stay on the deck, and see the fun; and the men would do their best to catch the beast, as they knew that somebody would make five dollars out of the job. Every few days we had a race of this kind, but there came a time when we had the last one. The rule always had been that the monkey should not be hurt, but should be caught unmjured, and brought down.

One day the captain had his charts out, spread over the table in the cabin — his very best charts, and things that were

pretty important. He was studying them, and marking off his ship's course, and left them a few minutes, to go into his state-room. That infernal monkey was around, and as soon as the captain was gone, he jumped on the table, dipped his paw into the inkstand, and began marking out a course on the chart to suit himself. He daubed that chart all over with ink, and when the captain came out of his state-room, and found what had been done, he was about the maddest man you ever saw. He made a grab for the monkey, but of course the monkey got away. He struck out for the deck, and shinned up into the rigging.

"The captain came out without his cap, and was perfectly white with rage. We saw that something had happened, but what it was we did not know. We were steaming slowly along, and the men were scattered all about the deck.

"'Pipe all hands to catch the monkey!' said the captain. 'Ten dollars for anybody that gets him, dead or alive!'

"We knew there was business then, and we went for the monkey; and the monkey knew there was business too. He understood there was no time for fooling. I fancied that that monkey knew it was a race for life or death, and he never tried so hard before to keep out of our way. Every man who could be spared from the management of the ship was sent into the rigging. We chased him from mainmast to mizzenmast, and from bowsprit back to the stern. He went into all parts of the rigging, and had several narrow escapes.

"We were closing in on him, and had him in very tight quarters, when, all of a sudden, he played a trick which he had never tried before. He jumped to the top of the smoke-stack, and then to the steam-pipe, and there he sat. The smoke-stack was too hot for him, but the steam-pipe was cool and comfortable. Our ship, you know, was a low-pressure one, and we only used the steam-pipe when we let off steam, or had an excess of it.

"Of course nobody could shin up that steam-pipe, and there sat the monkey for at least a minute. While we were all wondering what to do, one of the boys went to the pipe, and pulled the string of the fog-whistle.

"Well, sir, there was a jet of steam, and that unfortunate monkey was blown up about twenty feet into the air, and came down on the deck, stone dead, with every hair singed off him. He looked just as if he had been through the barber's hands, and was preparing to go to church. The boy picked him up, carried him to the captain, and got his ten dollars. We did not have any more monkeys on the ship after that."

Pet dogs are sometimes kept in mines, but they soon lose their activity, and appear so unhappy that the miners, out of pity for them, take them to the open air again. I once saw a dog that had been kept a fortnight in a silver mine, without once seeing daylight. I happened to be at the entrance when he was brought to the surface, and never did I see a dog manifest more joy than did this one. As soon as he was placed on the ground, saw daylight, and snuffed the clear, open air, he ran about, jumping first upon one and then upon another of the miners, and seemed to thank them for his release from prison. He kept this up for a quarter of an hour, and then he darted about in wide circles, running at the very top of his speed, and paying no heed to anybody. He ran in this way until fairly exhausted, and then came up to his master, and lay down at his feet. His master then endeavored to coax him into the cage, to descend the shaft again, but the dog would not move. As his master stepped into the cage, he tried to call him down, but the dog turned, and ran away. He had had quite enough of underground life.

I have seen dogs that had been kept a long time on shipboard act in just the same way when going on land. Sailing once from San Francisco, across the Pacific Ocean, we picked up, just before our departure, two small dogs — one a Skye terrier, and the other a black and tan. For the first few days they were not in love with sea life, but before we had been a week on our voyage, they were accustomed to it, and wandered around the ship at will. They made friends with everybody. The black and tan had the run of the main cabin, but the Skye lived forward with the men. The two

dogs played together a great deal. The black and tan would go forward, and apparently invite the Skye aft. He would come, and they would play about the deck; but he never ventured into the cabin. He appeared to know his place, and kept it very carefully.

Twenty-four hours before we sighted land, when it was more than a hundred and fifty miles away, those dogs began to sniff the air uneasily, and rather wistfully indicated that they knew we were approaching shore, and that they wanted to get upon it. But when we entered harbor, they did not manifest any particular wish for the land; and though they looked around the deck, and off towards the shore, they showed no desire to seek it.

It was morning when we came to anchor, and we immediately made our official visits, and returned to the ship about noon. Opposite our anchoring-place there was a partially wooded point, which, we thought, would give us a pleasant promenade; and so, in the afternoon, four of us went ashore, taking the dogs with us.

They were reluctant to get into the boat, and the sailors were obliged to carry them down the gangway stairs to the boat, and put them ashore when we touched land. But as soon as they had touched it, and realized that they were on solid earth, they began to caper and run about in the most extravagant way. I think that before we had walked a mile those dogs had run at least ten miles, and had examined, in their canine way, every bush, and tree, and shrub in the region. Several dogs of ten times their size were wandering about, but these little brutes gave chase to them as readily as though the strangers had been rats. When they came back to our landing-place, they did not want to enter the boat, and we had to carry them in.

After that, whenever a boat went ashore, there was no occasion to invite the dogs or urge them to go. The very first instant they saw any preparations for leaving the ship, they would descend the gangway, and enter the boat; and if driven back, they would look wistfully over the side, and

sometimes fairly howl with sorrow. On two or three occasions, when we allowed them to descend to the foot of the gangway stairs, and pushed off without them, they jumped into the water, and followed us.

I may still further digress, and say, that on one occasion we had at sea with us a dog evidently born to a marine life. He was really attached to that ship, and apparently never cared to go ashore. If taken on shore by the captain or one of the officers, he would quite likely get lost, but he always knew enough to make his way back to the landing. If the ship was tied to the dock, he could select her from dozens of others. He never made a mistake, and never went aboard the wrong craft. At sea he would stand his watch as regularly as any one of the officers. When the starboard watch was called, he roused himself up, and went on deck. Sometimes, when he would be lying asleep, a call would be made for all hands, and he would be the first on deck. The rest of the crew, when called out, were generally obliged to put on some article of dress — at any rate, a hat, and possibly a coat; but Charley, as the dog was called, had no toilet to make, and consequently he would be the first at his post.

If he saw a man pulling at a line, he would seize it, and pull also; and sometimes, when there was no chance for him to pull at the line, he would seize the rear man by the seat of his trousers, and pull away for dear life. The men didn't like this sort of thing, as sometimes he included a little flesh in the folds of the trousers; and Charley got a good many threshings in consequence. But he was so anxious to do something, that within fifteen minutes after he was thrashed, if he saw a line of men hauling in a rope which he could not get hold of, in would go his teeth into the trousers of the rear man, — and he had long and strong teeth too.

Every dog has his day, and Charley had his. As before stated, he could pick out his own craft among dozens of ships. If she was anchored from the shore, he would come down to the water's edge, give a look around, and discover the ship. Then he would strike boldly into the water, and swim towards

her. Somebody would see him, and a rope would be lowered, with a noose at the end. Charley would put his fore paws in the noose, seize the rope with his teeth, and be drawn on deck.

One day, when the ship was at anchor in the Bay of Panama, Charley started to swim out, as usual. The bay was full of sharks, and just as he had reached the side of the ship, and was putting his paws through the noose lowered to receive him, there was a swirl of the water. The head and belly of a large shark were visible for a moment, and with a single yelp of pain and terror, Charley was dragged under the water, and never seen again.

XLVIII.

OUT OF PRISON.

WONDERFUL ESCAPE FROM A FRENCH PRISON. — PLANS OF ESCAPE. — A LONG LABOR. — TUNNELLING THROUGH A WALL. — INGENUITY OF A SAILOR. — LUCKY ACCIDENTS. — DISCOURAGING EVENTS. — HOW SUCCESS WAS ATTAINED. — ELUDING THE GUARDS. — REACHING A PLACE OF SAFETY.

AMONG the most remarkable efforts of prisoners to escape from their confinement was that of some French Communists, who were sentenced to incarceration upon their failure to establish their government in France, after the downfall of Louis Napoleon in the disaster at Sedan. The story, as told by one of them, is of the most thrilling character.

We were political prisoners — three hundred of us — in the fortress of Port Louis, a part of that line of fortifications which was built by Sully to defend the French coast from Brest to La Rochelle. At high tide the fortress is entirely surrounded by the sea, and communicates with the land only by a bridge. Round its circuit runs a rampart on which the casemates abut. The entrance is opposite the bridge — that is to say, facing the peninsula on which stands the little town of Port Louis. On the left are the offices of the prison authorities and the residence of the governor; on the right, the quarters of the soldiers. In the centre of the fortress are barracks, forming a square, and having an inner court; and it is here that the prisoners are confined. The soldiers are strictly forbidden to speak to the prisoners. Their duty consists in mounting guard on the terrace running along above the casemates. A road, known as the Round Road, goes round the citadel, and separates the casemates from the buildings in which the prisoners are confined. The ground floor, occupied by the prisoners, is divided into twenty dor-

mitories, of unequal size, containing from seven to thirty prisoners each.

The dormitories are lighted by windows looking out on one side on the Round Road, and on the other side on the inner court; and these windows are protected by strong iron bars. Having observed that the floor boards were badly joined, the idea occurred to us of working out with our finger-nails the nails by which they were fastened; and having done this, we discovered under our room large excavations without any outlet, which had doubtless been formed for ventilation. On lifting two of the floor boards under my bed, we were able to descend into this cellar; and then, after working holes in the walls separating the different compartments, we reached the foundation wall abutting on the Round Road. Immediately the working party had descended into the cellar, the floor boards were replaced, and were only lifted again when it was necessary for those below to remount. The only tools we had were large nails or spikes, which had been used in fixing the stand for the arms, these quarters having formerly been occupied by soldiers. We had worked out these nails with our hands; and to do so had cost us several days' labor and no little laceration of fingers. We then conceived the idea of excavating a tunnel to run from the cellar to the sea. We found that we were just on a level with the Round Road; but this road served as a thoroughfare for wagons loaded with powder, and for all the vehicles bringing provisions and other stores into the citadel. It was therefore necessary, before excavating the tunnel, to sink a vertical shaft about thirteen feet in depth, in order that the superincumbent weight of the wagons passing might not cause the road to fall in.

Digging with the nails, we loosened the earth, which we then scooped up in a tin plate which we had been able to conceal. When we had in this manner filled a dinner napkin, we formed a sort of chain, and passed from hand to hand the napkin full of earth, which was deposited in the farthest of the underground compartments and well trampled down.

so that it might occupy as small a space as possible. There were only six of us to carry on this work, for the numberless difficulties which stood in the way of our escape had discouraged the others. We followed to the last the same method of disposing of the earth and the stones, which we worked out one by one after incredible efforts. Having finished this shaft of thirteen feet in depth, we commenced the horizontal tunnel. We had in the first place to pass under the Round Road, which is twenty-two or twenty-three feet in width. As the earth was much easier of excavation than stone, we excavated our gallery with a downward slope, in order that we might be able to pass underneath the foundation wall of the casement facing our dormitory. Thanks to this slope, we succeeded so well that for a space of about forty-six feet — that is to say, until we reached the wall of the rampart — we had only to work through earth. This tunnel was just large enough for one man to creep along in it. We therefore took our turns at the excavations, lying flat on our faces. Unforeseen accidents occurred to increase the difficulties, already great, which we had to surmount. The part of the tunnel passing under the Round Road, notwithstanding the depth below the surface at which it was excavated, and notwithstanding the care we took to construct it arch-shaped, so that it might be better able to support the heavy weights passing above, threatened entirely to fall in. Heavy rains had loosened the soil, and pretty large masses of earth fell every day. It was necessary that this part of the tunnel should be propped up. How could it be done? One of our number, who had been a sailor, and who was a resolute and enterprising man, as sailors usually are, conceived the idea of supporting the earth by packing against the sides of the tunnel the stones which we had removed from the walls. This was done; and the downfall from above being thereby effectually prevented, we were able to continue our labors. A second accident, which seemed at first much more serious, then occurred, threw us into a fever of anxiety, and delayed the accomplishment of our project.

When our tunnel had attained a length of about thirty-three feet, we could not get our light to burn. We thought this phenomenon was caused by want of air, and this is what we did to remedy the defect. While one of our number was kept constantly at work excavating, another, standing in the shaft at the entrance of the tunnel, and making a sort of fan of his jacket, forced a strong current of air into the tunnel. However, after some few days, when the length of the passage had been increased by a little more than a yard, there was no longer any need of our improvised ventilator, as the light burned of itself. There doubtless occurred in this part of the earth some gas which prevented our light from burning; and this gas, having little by little become dispersed, the phenomenon ceased.

At length, after being distracted by doubts and fears, after the innumerable difficulties which every day for three months we had encountered, — difficulties which we should never have overcome but by dint of sheer energy, and thanks to that incredible patience with which prisoners only are endowed, — we reached the wall of the rampart. A few more days of labor and suffering and we shall be free. Free! The reader will understand what courage and hope that word must have given us to induce us to undertake and enable us to accomplish a work which, under any other circumstances, would have appeared to us as simple madness. Alas! it was at the very moment when we seemed to be approaching the end of our fatigues that the obstacles became most difficult to surmount. Some of our number seemed ready to abandon the task which for more than three months we had been prosecuting. All our labor was going to be thrown away. Again it was the energy of the sailor which saved us, and gradually revived the hopes of his weaker brethren. The wall of the rampart which we had still to pierce, and which is, of course, intended to resist cannon-shot, seemed to us proof against anything. It is constructed of enormous blocks of granite, jammed tightly together by smaller stones driven in like wedges, and the whole is united

into one solid mass by means of Roman cement, which has become as hard as the stone itself. We endeavored with the nails — the only tools we had, and which we had put in wooden handles — to loosen the joints of the stones. With another piece of wood we had made a mallet, and to get the wood necessary for these purposes we had broken up the musket-stand and the barrack-shelves.

But the only result of our efforts was to blunt our implements. What could we do to supply our lack of tools? Our first thought was to take away a bar from one of our bedsteads, which were of iron; and this we did. This bar which we took was two feet in length and about as large round as a man's thumb. After using one of the ends of this bar against the stone, we tried what use we could make of it as a lever. But the stones were too hard and too heavy, and our iron bar bent like a switch. What could we do now? We were not disposed to abandon at the last moment a project which had cost us so much toil; and yet we had many times emerged from our tunnel with the skin rubbed off our hands, and our faces as red as fire, having hardly succeeded, after long days of fatiguing labor, in working out a stone about as big as one's fist. At length the bright thought occurred to one of us of making the very things which had been intended to secure our confinement contribute towards our escape. We determined to remove one of the iron bars which guarded the window. These bars were five feet and a half in length, and an inch and a half thick. But, in order that the warders might not perceive that one of them had been taken away, we first of all made an imitation bar of a piece of wood, cut from one of the broad shelves, and which we colored with ink and blacking. When this was finished and dry, we succeeded in unfastening with nails one of the bars of the window. We watched for a moment when the sentinel on the rampart opposite our window had his back towards us, and little by little loosened the stones in which the bar was set. When this was done, taking advantage of one very lucky moment, we gave the bar a wrench, got it

out, and instantly replaced it by the imitation bar of wood. We then took the precaution of stopping up with bread crumbs — which we kneaded so as to look like mortar — the hole made in loosening the bar, and afterwards threw a handful of dust over the whole, that the different shades of color might not betray our device. This bar of iron became in our hands a formidable weapon. Without it we must inevitably have lost all the fruit of our labors. When we were in possession of this formidable tool, as we had now to attack stone, it was impossible for us to continue to work lying flat on our faces, as we had done when it was a simple question of burrowing in the earth. It was absolutely necessary that we should have complete control over all our movements. We were obliged, therefore, before resuming our attack on the wall, to enlarge this part of our tunnel, and to excavate in front of the wall a little chamber high enough for two men to work there on their knees, and large enough for us to use the iron bar to advantage. Of this bar we made, as occasion required, a crowbar or a ram. Then, and not till then, did we make any real impression on the wall. The scraps of information which we had been able to gather from the unguarded talk of the warders had given us a false idea with respect to the thickness of this rampart. We thought it was only about six or six and a half feet thick, whereas in reality it was more than sixteen feet. When, therefore, after indescribable labor, we had worked away the stone bit by bit, and made our hole six feet and a half in depth, we were disconcerted to see no sign that we were approaching the end of our labors. Far from being discouraged by this, however, we redoubled our efforts, and our astonishment increased as the hole became deeper. Still we worked on. The hole became ten feet deep; then twelve feet; then fourteen feet: and it was not until we had dug sixteen and a half feet into the wall, that the man who happened just then to be at work giving a heavy blow to the stone, pierced it, and after being dazzled for a moment by the sudden entry of the light, saw the sea stretching out in front of him. He immediately

stopped up the aperture, and came to impart the welcome news to his comrades. We took counsel together, and decided that our escape should be attempted that very night.

And here I must interrupt the course of my narrative for a moment in order to give the reader a few necessary explanations. "How was it," he will say, "that the officials did not perceive the destruction of the wood-work which you had been obliged to break up to make the handles of your tools, and the bar of wood with which you had replaced the iron bar of the window?" To this question I have a very simple answer to give. The officials of the prison had very little to do with us. The warders never came into our rooms except morning and evening, when they came to call the muster-roll. These visits were made at fixed hours, and I need hardly say that we were always sure to be present when they were made. We took good care, too, to work only in the daytime, for in the silence of night the dull blows struck underground would have been audible above. The warders went from room to room, calling over the muster-roll, and having seen that all the prisoners were in their places, immediately retired without troubling themselves about what might be going on. Besides, no *détenu* wishing to retain the good opinion of his comrades ever spoke to the warders: and these latter, finding themselves thus isolated, sought no intercourse with the prisoners. Again, *détention* being an essentially political punishment, we were not subjected to hard labor, and within the court, as well as in our rooms, were absolutely free. Another question which the reader will have asked is this: "How did you manage to keep your secret unknown during these four months?" Again his curiosity shall be satisfied. There was no secret, and there could not have been any. It was impossible for us to descend into our cellar and tunnel, or to remount to the surface, without being seen by those of our fellow-prisoners who happened to be in our dormitory. The dormitories being open all day long, the prisoners passed freely from one room to another, and by degrees they had all come

to know of our resolution. The majority dissuaded us, and endeavored to point out all the difficulties which stood in our way. Our project seemed to them an absolutely impossible one. They thought that, our work having lasted so long, the officials had got scent of it, and were letting us go on, because they intended to have soldiers stationed ready to shoot us when we attempted to make our escape. We allowed our comrades to talk thus, and only asked one thing of them — that they would not betray our project. This they all promised, and, as the reader will see, they kept their word. I must, however, add that we had deceived them as to the time of our departure. When they inquired as to the condition of our work, we carefully guarded ourselves from revealing the stage at which we had arrived. Several times I gave them to understand that our work would not be finished before the end of January; and on the very day when everything was finished, we had given no sign of our approaching departure until we were about to set out. We had nothing more to do but to enlarge the hole we had made in the day, and to get out through that aperture.

The rampart which we had pierced is on the left of the citadel, and therefore faces seaward. When the tide is low the sea retires and leaves the rocks dry for a distance of sixty or seventy feet around. On the night of our escape the evening muster-roll was called as usual, and we were shut up in our dormitories. Almost immediately two of our number went down to complete the enlargement of the hole, and this labor occupied them two hours. On their return we informed our companions that the moment for our escape had arrived. Their emotion was certainly greater than ours. Before setting out we took the precaution of placing in our beds our bolsters, made to look as much as possible like a man's body, and with our night-caps stuck at the top. We also spread our prison clothes on our beds, as we were in the habit of doing every evening. Our object in adopting these precautions was to deceive the warder when he came in the morning to call over the muster-roll. The stratagem suc-

ed, and the officials did not know of our flight until six ck the next evening. This was very fortunate for us, herwise we should not have been able to get away any t distance from the citadel, and we should infallibly have . retaken. It was the 14th of November, at nine o'clock ıe evening; the tide was out, and the rocks at the foot ıe rampart were left bare. We had been able to find out imes of the tides in the almanac at the canteen. Our autions had been all carefully taken, and, thanks to the h of the shaft we had sunk at the entrance of the tunnel, to the slope given to the tunnel itself, the hole which we made in the wall of the rampart was only ten feet above ocks.

ıe after another we crept through the tunnel, and then ng through the hole in the wall, we were able, while clinging with our hands to the wall of the rampart, to h with a drop the rocks beneath. Then, following all ends of the wall, and keeping as near to it as possible, passed around to the land side of the fortress. In like ner we passed along over the beach, keeping as near as ible to the little town, situated about one thousand yards the fortress; and thus at length, after creeping silently een the huts of the coast-guardsmen, we reached the dry opposite a little village called Loe Malo. The tide was coming in. It had been our intention to divide, as soon e were clear of the fortress, into two groups of three each, only six prisoners having ventured to escape. We, ever, marched on together, and without resting during remainder of the night, in order, as quickly as possible, at as much distance as we could between us and the for-. Our object was to reach some little port of Brittany, then endeavor to take ship for England. When we were ght to the citadel the authorities had caused us to be itely searched, and had not left any money in our pos-on. I had, however, succeeded in concealing a small by carefully sewing it into the lining of my coat. This ey was of the greatest service to us, as it enabled us on

the following morning to take the railway, and thus in a few hours to put a considerable distance between us and the citadel.

After marching all night, however, through a drenching rain, if we had presented ourselves at the railway station as we then were, our appearance would have excited suspicion. We had taken the precaution of bringing with us from the prison shirts, brushes, blacking, and, in short, everything necessary to our toilet. In a place of concealment we carefully brushed up and dressed ourselves to the best of our ability; and when, at daylight, we presented ourselves at the railway station, we were clean and tidy, and appeared to have come from some place very near. I had brought a book away with me from the prison, and this I carried under my arm to give myself the look of a traveller. On our way to the railway station we saw three *gendarmes* running towards us, gun in hand. Without faltering we walked coolly on, and the *gendarmes*, as we came up, politely stepped aside to let us pass. We took the train for a small port in Brittany, and in the evening succeeded in getting on board an English vessel. We were saved!

XLIX.

THE GAMBLING HELLS OF GERMANY.*

THE FOUR GREAT SPAS. — DESCRIPTION OF BADEN, HOMBURG, WIESBADEN, AND EMS. — ROULETTE AND ROUGE-ET-NOIR. — SPLENDOR OF THE SALOONS. — THE PERSONS WHO FREQUENT THEM. — PROFITS AND PECULIARITIES OF THE DIRECTION. — THE PHILOSOPHY OF GAMBLING. — WHY PLAYERS LOSE. — STRANGE SUPERSTITION OF BETTORS. — THE INVALIDS. — DROLL SCENES AT THE PUMP-ROOM. — THE MAN WITH A SNAKE IN HIS STOMACH. — THE ROBUST HYPOCHONDRIAC.

THE best known and the most popular of all the fashionable and gambling watering-places in Europe are Baden-Baden, Homburg, Wiesbaden, and Ems.

The first, a town of some seven thousand inhabitants, is delightfully situated in a valley of the Black Forest, on a small stream known as the Oehlbach, eighteen miles from Carlsruhe, in the Grand Duchy of Baden. Homburg von der Hohe, having a population of about five thousand, is the capital of the Landgraviate of Hesse-Homburg, and may be considered a suburb of Frankfort on the Maine, as it is only nine miles from that city. Wiesbaden, fourteen miles west of Frankfort, contains nearly twenty-five thousand people, and is the capital of the Duchy of Nassau. This pleasant city is on the Salzbach, an affluent of the Rhine, and at the foot of the delightful Taunus Mountains, its situation and climate being almost identical with those of Homburg. Ems, often called Bad-Ems, is a hamlet on the Lahn, fifteen miles north of Wiesbaden. It is also in Nassau; is shut in by hills, has

* The gambling spas of Germany, but not those of other countries, have been closed since Chapters XLIX. and L. were written; but the chapters have been left in their original form, as the present is a better tense for description than the past.

a pleasant terrace along the river, and is surrounded by delightful scenery.

Though all these spas, or baths, as they are styled, are in Germany, they are visited during the season, extending from May to October, by invalids and pleasure-seekers from every civilized country. July and August are the most fashionable months, and then the springs are frequented by French, Spaniards, Dutch, English, and Americans, as well as Germans. The principal patrons, independent of the home population, are from France, England, and our own country, albeit almost every nationality under the sun is represented at those centres of folly and dissipation. I have seen Turks and Armenians at Baden, Greeks and Persians at Homburg, Egyptians and East Indians at Wiesbaden, and Mongols and Arabians at Ems.

Baden (it is called Baden-Baden to distinguish it from other places of the same name) is the most fashionable of the four resorts, and cannot be surpassed for the beauty of its scenery. The picturesque heights rising above the valley, the ruins of the old castle overlooking it, the magnificent views, the pleasant drives, handsome villas, and charming walks in the neighborhood, with the agreeable and varied society, render it remarkably inviting. The number of strangers annually flocking to Baden is from fifty to sixty thousand, and these, especially in midsummer, crowd the hotels and countless boarding-houses to overflowing.

Homburg within the past ten years has also become very fashionable, and counts its summer visitors by the tens of thousands. It lacks the pictorial quality of Baden, but its atmosphere is reputed to be extremely salubrious, and its society is delightful, of course. Being so near Frankfort, many persons, particularly those in delicate health, reside there all the year round, and many of the Franforters have their residences at the springs.

Wiesbaden, even more than Homburg, is the home of the denizens of the old German capital, and by reason of its larger population, has greater attractions than the rival

watering-place. A large number of retired bankers and merchants from various parts of the Continent have villas at Wiesbaden, and every year the number increases.

Ems has had, and still has, the reputation of being patronized extensively by crowned heads and the nobility, but the prosperous and pleasure-loving generally are hieing to the banks of the Lahn more and more every season, and making its society more agreeable and democratic at the same time. The annual attendance is much less than at any of the other three springs, but they who go to Ems claim that the quality of its visitors more than compensates for any want of quantity.

The four German spas are on the whole very much alike, barring topical features. They each claim great antiquity in regard to the fame of their waters, holding, and upon good grounds, that the old Romans found vast benefit in the healing virtues of the baths. For generations they were frequented only by invalids, but of late years gayety and enjoyment have been the object of the majority of their patrons. The gambling, it must be confessed, has been, and is still, the chief attraction; not so much because all the visitors wish to play themselves, but they like to see others play, and to be part of the great variety of people whom the tables draw to the different spas. Since the gambling has ceased, as it did last year (1872), the German watering-places have lost much of their allurement, and the thousands who used to go there will be represented by hundreds merely. What is considered wickedness has unquestionably its spice and charm for the average mind, and a certain departure from the customary and conventional creates a species of magnetism.

The games at the baths are *roulette* and *rouge-et-noir*, frequently called *trente-et-quarante*. The smallest stake allowed at *roulette* is a florin (about fifty cents) and at *rouge-et-noir* two florins. The largest bet that can be made at the former is four thousand florins, and the largest bet that can be made at the latter game is five thousand six hundred florins. The capital at the *roulette* table is thirty thousand francs (six

thousand dollars), and at *rou* [illegible] hu[illegible]red and fifty thousand francs (thirty thou[illegible]dollars). When this sum is won by any of the bettors, the [illegible]nk is declared broken, and the table is closed for the day, but is re-opened on the day following for all to test still further their good or ill luck. Newspaper correspondents are constantly writing about the breaking of the bank at Baden or Homburg, depending, as many such writers do, upon their imagination for their facts. The truth is, the bank is very sel[illegible]om broken, — sometimes not more than once or twice during t[illegible]e whole season, — and when it is, it almost invariably wins [illegible]k from the fortunate player all, and much more than he has [illegible]ined.

The gambling saloons are [illegible]rge and splendid buildings, beautifully frescoed and gil[illegible] in the interior, and luxuriously furnished. They are ca[illegible] the Conversationshaus, the Cursaal or Curhaus, containing, in addition to the gambling tables, spacious apartments for reading, dining, dancing, and lounging. The tables are thronged d[illegible]ing the height of the season by elegantly dressed men and [illegible]men of divers nationalities. They are presided over by the banker, — so he is styled, — who receives and pays out the money, and keeps general watch over the game, and by several croupiers, who with a little rake, draw in or push out the stakes as they are won or lost by the bank. During July and August, the gaming saloons, in which there are generally six or eight roulette or rouge-et-noir tables, present a brilliant spectacle. Anybody may enter, if he be respectably dressed and well-mannered, though he must leave his cane or umbrella with the lackeys in the vestibule, remove his hat, and refrain from speaking above a whisper. Why the Goddess of Chance should be entitled to the homage of silence may seem singular; but when it is remembered that all gamesters, while engaged at play, are exceedingly nervous, and therefore morbidly sensitive, it is plain enough why the strictest order and quiet should be carefully preserved.

The spectacle, I have said, is brilliant; and indeed it is. The saloons are adorned like palaces; in [illegible]rors, in deep

CONVERSATIONHAUS AT BADEN.

CONCERT IN THE GARDENS AT BADEN.

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gilt frames, are upon the walls; rich silk and lace curtains depend from the windows; gorgeous chandeliers diffuse their radiance; velvet sofas invite to rest, and the clink of gold tempts to hazard. About the tables are gathered young and lovely women, richly dressed, from the cities of the old world and the new, and men in fashionable attire, representing various ranks, professions, and callings. There are dowager duchesses from England, pretty countesses from France, fleshy baronesses from Germany, delicate maidens from America, lorettes from Paris, adventuresses from Naples, danseuses from Petersburg, and actresses from Vienna. Spanish grandees stand shoulder to shoulder with French communists, who fought like tigers for the possession of the French capital; Calabrian bandits, who have retired, independent, from the trade of throat-cutting, are in close contact with honest Holland burghers; Russian princes hand their stakes to professional blacklegs recently arrived from London; Swiss statesmen exchange nods with bankrupt gamesters; and Belgian chevaliers of industry smile, as they win, upon Teutonic philanthrophists risking a few napoleons, simply for lack of something better to do.

The air of the players is entirely genteel, and their manners completely negative and subdued. Whether they are lucky or unlucky, would seem to make no difference to them; they give no outward sign; their faces are usually immovable, unless high breeding, as it is commonly understood, prompts them to look cheerful when they lose, and melancholy when they win.

The slightest disturbance is very rare in the saloons. I have been in them, day after day, without noticing the least departure from order, or the smallest violation of conventional courtesy. Occasionally, some undisciplined man manifests his nervousness and excitement outwardly, when, if the stony stare or facial disapproval of those about him does not chill him back to conventional bearing, the lackeys, always in attendance, induce him to carry his demonstrations into the open air.

The impression obtained from the saloons by a new comer

is, that all the habitués are amiable, insouciant, comfortable, and prosperous. He would never suspect that, behind all this fair comedy, lurks the sombre spirit of tragedy; that the serenest faces mask an aching mind, and that the softest smiles hide, but do not help, a breaking heart. Nowhere under the sun is social masquerading more skilful and complete than in the German temples of chance. Everything is so smooth, so decorous, so delicate, so nicely adjusted, that one who seeks for inner contrasts must seem like a cynic and an iconoclast. To him who can believe in appearances, Wiesbaden and Ems are the most satisfactory places of sojourn. They express the essence of formal conventionality, and the rounded relation between unexceptionable raiment and unexceptionable manners. They point to the promised land of adaptation, and predict the millennium of mode.

There have ever been, and there ever will be, any number of persons foolish enough to think they can break the bank, if they will only watch the game closely, and profit by the favor of fortune. It is this delusion which sends, year after year, so many victims to the Conversationshaus and Cursaal, and keeps up the faith of the victims, even after they have been ruined again and again.

The gaming saloons are governed and regulated by a stock company, under the name of the Direction, which is the closest of close corporations. It is eminently impersonal too, nobody knowing the names of, or, indeed anything about, its members. Of course, its stock, like that of some of our gas companies and banks in New York, is not to be had, and is never quoted. The directors pay a license to the petty governments under which the tables are kept, and which are largely sustained thereby. The license varies materially. At Baden it is about seventy-five thousand dollars a year, and the Direction, in addition thereto, pays all the expenses of the Conversationshaus, whatever is required for the preservation and improvement of the adjoining grounds and gardens, and makes many other outlays, which must increase the total sum to fully one hundred and fifty thousand dollars. At Homburg

the license is some fifty thousand dollars, and, moreover, the Direction of the Cursaal lights the little town, keeps it in good condition, supports its hospital and other charitable institutions. At Ems and Wiesbaden, the government tax — for that is what the license really is — is about sixty thousand dollars for the former, and forty thousand dollars for the latter place.

The capital of the Direction is set down at from two million to one million five hundred thousand dollars, though I seriously question if much more than one tenth of the sum has ever been paid in. The tables usually clear from two hundred and fifty thousand to five hundred thousand dollars annually; the profits being larger, of course, at Baden than at Ems, and varying with the season, and the luck of the bank. Not long ago, the Homburg bank was broken five times during the year, and yet the Direction, even then, declared a dividend, it is said, of nearly twenty-five per cent. on their capital. The income from the stocks of the German gambling companies is reputed to be enormous, and I have met men in many foreign countries who were credited by rumor with owning such shares. They had no visible means of support, and still they lived luxuriously, even prodigally, merely because they had had the good fortune to secure a small amount of stock in the Cursaal or Curhaus.

The limitations and the percentage at *roulette* and *rouge-et-noir* are seldom taken sufficiently into account by the *galerie*, as the bettors are named. Those, in the long run, will beat anybody and everybody, whatever run of luck they may have now and then. The games are based on an ultimate certainty, almost mathematical, in favor of the bank, and the prevalent notion that the players can have any permanent advantage is simply absurd. The chances on the side of the bank are so many, that, in a given time, it must inevitably win, and win largely. All the systems by which the *galerie* expect to triumph are utterly false and deceptious. They have done more, by a certain speciousness, to lead men to their ruin, than anything connected with the passion for has-

ard. They invariably fail, because of the limitations in bets, and the percentage in favor of the tables; but the advocate of the system very seldom reckons upon these great drawbacks. This class of men believe that will happen which they wish to have happen, and are therefore incapable of clear perception of anything opposed to their theories and desires.

The one adverse fact, above any other, to bettors generally is, that they very seldom, if ever, play as recklessly when they are winning as when they are losing. The reason is that, in the latter circumstances, they are endeavoring to win back their stakes, and are consequently in more or less desperate mood; while in the former case they are satisfied with what comes to them, and not tempted constantly to augment their bets for the sake of getting even. Irrational and ridiculous as it appears, there certainly seems to be such a thing as a run of luck, good or ill. We have all experienced this many times, albeit we may express the phrase in other words. On certain days things go wrong with us, and on certain other days they flow smoothly and prosperously, though we are wholly unconscious, on any of the days, of doing aught except our best to accomplish desired results. Sitting down to a game of whist in the evening, we find we cannot get a good hand, shuffle or change the cards as we may. The next evening, or the next morning, high cards and trumps come to us at every deal, as if some good genius had arranged the deal for us. What is this but a run of luck? In gambling, as every gambler knows, men are constantly having such runs. Whatever card or color you lay your stake on is almost sure to win to-day, and to-morrow almost as sure to lose. When you are fortunate, you make your ventures with at least a moderate degree of prudence. When you are unfortunate, your only thought is to get back the money you have parted with, and you keep doubling your stakes in the hope of achieving your purpose, instead of quitting the table, as you ought, when you plainly discover that fate is against you; or, in other words, that some mysterious and incomprehensible influence thwarts your every purpose.

Such inexplicable agencies or influences render gamesters superstitious. Having seen the tribe in almost every part of the world, I have always found them more or less tinctured with superstition. No amount of facts or arguments will drive it out of them, for by long indulgence it has grown to be next to an instinct. They have implicit faith in luck of every kind — in lucky days, lucky circumstances, lucky persons, lucky influences. Sometimes they will not bet themselves, but will ask others to bet for them. Something occurs in the morning which they interpret as a warning, and for the remainder of the twenty-four hours they will not touch a card or lay a wager. At the German baths this peculiarity is frequently observed. A man in luck is pestered to bet for others, and is offered a percentage if he will do so. This or that person is regarded as unlucky, and a patron of the green cloth will not stand on the same side of the table with him. A passing cloud, a chance-dropped phrase, a change of position, or any one of a thousand nothings, will induce a professional gamester to make, or prevent him from making, risks, concerning which he has ordinarily no prejudice. The folly of play is much surpassed by the folly of players, who become so permeated with fancies, theories, and fanaticisms, that on the subject they are specially interested in they are positively monomaniacs. I have talked with old habitués of Homburg and Wiesbaden respecting chances, coincidences, and systems, until I have discovered that long attendance on and close watching of the treacherous tables had absolutely turned their brains. They thought they were the shrewdest and most sagacious of mortals, and pitied me supremely, because I happened to have a little common sense in regard to *roulette* and *rouge-et-noir*, and because I would not believe that mere chance should be treated as if it were a positive science.

No one can form any adequate conception of the mental vagaries, bordering upon lunacy, of professional gamesters, until he has spent several seasons at the German spas, and become intimately acquainted with the men and women composing the *galerie*. Their entire conduct is regulated by a desire

to obtain luck. They strive to propitiate fortune, as if it were, as the ancients believed, a personal agency, subject to unaccountable whims and caprices. Many of their acts of charity are done not so much from benevolence as from a notion that it will influence favorably the issues of the games to which they are so wedded. This is true not only of gamesters abroad, but of gamesters everywhere. As a rule, they are far from intellectual, and hence superstition meets with little resisting power when it has once begun to encroach upon their understanding.

There are not only different classes of players, but players from different motives. The object of the majority is merely mercenary: they frequent the tables only to win money; they make hazard a business, foolishly hoping to reduce it to something like a rule. Other habitués of the springs bet for excitement, as they drink wine and seek adventures. They are not avaricious. When they win largely, they spend freely; and at the end of every season, whatever their success, they are much behind the game. The members of the third order are sufferers from ennui, and regard *roulette* and *rouge-et-noir* simply as a pastime. They have formed the habit of playing, and cannot break it. Their stakes are small, generally; but they are dévoted to the tables, sitting there from eleven in the morning to eleven at night, — the fixed time for the perilous sport, — and frequently do not win twenty florins a week. A number of persons play because it is the fashion, though they do not continue it long, for the same reason. The game proves so magnetic that they either feel it a duty to abandon it altogether, or they are drawn into it, and are very soon too weak to resist its fascinations.

Very many, who have begun in the spirit of imitation, have grown to be confirmed gamblers. One of the most infatuated players I have ever known was a Spaniard, who went to Homburg to get rid of the rheumatism, and who, after three seasons of abstinence, put down a single napoleon, simply because he did not wish to seem odd. The risking of that little coin has since cost him a small fortune; and if he were to live

a thousand years, — as he told me himself, — he could not be near *rouge-et-noir* without taking part in it.

America, or rather the United States, is more puritanic than other countries. Gambling is regarded here quite differently from what it is in Europe. Even our transpontine cousins, the English, are much more addicted than we to play. They never have social whist parties without betting at least enough to create an interest. The Germans, unless in prosperous circumstances, are preserved from the habit of gambling by their constitutional economy and thrift. The Latin nations have a natural fondness for whatever turns upon chance. Of these people, the Spaniards enjoy gambling most, and the French least, while the Italians are but little behind the Spaniards in this particular. It is safe to say that all three, hearing the spinning of the *roulette* wheel, and the clinking of coin at *rouge-et-noir*, could not long be kept from the seductive tables. The Russians — those who travel, at least — love the green cloth, and figure prominently among its devotees. Most of them have money, and are such ardent pleasure-seekers, at the same time possessed of something like an American, vanity for spending and making display, that they rarely fail to participate in any dissipation which offers.

It must not be supposed that all the frequenters of the spas indulge in play; for many of them go there for recreation, and merely look at the games. Then, as I have remarked, thousands visit the springs for the benefit of the waters. That they have medical virtues cannot be well questioned, after one is told, as I have been told, of extraordinary cures by those who have been sufferers. Ordinarily, a casual visitor, who rises late, sees very little of the invalids; but if he has a liking for early morning air, and bends his steps towards the pump-room (*Trinkhalle*), he will encounter men and women afflicted with every variety of disease. He will observe them also on their way to and from the baths, — young and old, dark and fair, rich and poor, handsome and homely, cultivated and coarse, graceful and awkward, — all in quest of the invaluable boon, which we never appreciate until it has slipped away.

There is something melancholy, as well as grotesque, in the moving panorama of the distempered. They walk with canes and crutches, are carried in invalid chairs or wagons, and look so wan and rueful that I have often felt prompted to apostrophize health as the sum of all blessings. There are young and fair women, fragile from their birth, for whom there is not an atom of hope, and who yet believe they may find some miraculous cure in the baths for lack of constitution, and for inherited disease. The *bon vivant*, peevish and irritable from the gout, limps along, and the overworked man of brains, paralyzed on one side, is wheeled over the pavement by the stupid lackey, unconscious that he is the possessor of nerves or a stomach. The dyspeptic — of course an American — glowers on everybody as he passes, but appears to hate no one as much as himself. After having fancied himself cursed with every disease, and after consulting physicians of the highest grade on both sides of the Atlantic, he has come to Ems to test the virtue of the baths. They have done him no good, for he will not be prudent either in his diet or his habits; and he will go home with his mind made up that all medicinal springs are humbugs. He is unaware that the cause of his ailment is dyspepsia, and that it has gotten into his mind. On Monday, he thinks he has consumption; on Tuesday, he fancies it is liver complaint; on Wednesday, he is sure his kidneys are deranged; on Thursday, no one can convince him that he is not suffering from enlargement of the heart; on Friday, he declares he has the marasmus; on Saturday, he swears nothing was the matter with him originally, but that the infernal physicians have poisoned him; and on Sunday, he contemplates suicide as a means of relief. The poor man is the victim of bad cooking, for which our country is famous, and his excessive haste in eating. If he had been born in France, and taken his meals at the Paris restaurants, he would be to-day one of the most contented, instead of the most miserable of men. Talk as we may, digestion is the foundation of human happiness, and will keep us on good terms with ourselves when an unsullied conscience and troops of friends are of no avail.

Hypochondriacs are to be met at the celebrated baths, of course; for wherever there are disordered bodies there are disordered minds. No human creature is so ill as he or she who imagines an illness, since the subtlest art of healing cannot reach the shadows of emptiness. I remember an Englishman at Homburg, one of the most robust of fellows, who, after quitting college, had begun reading medical works only to convince himself that he had some deep-seated disease. His belief stimulated his appetite for information. He pored over all the pathological treatises he could find, and every week fancied that he had some new ailment. He travelled everywhere, swallowed entire drug stores, visited every watering-place in civilization. He had been nearly twenty years in pursuit of the health he had never lost, when I made his acquaintance at the Quatre Saisons. Happening to touch on the subject of hygiene, I set him off upon countless theories, and upon the bitterest denunciation of physicians. He informed me confidentially that he had a serpent in his stomach, and that he felt it every day gnawing his vitals. He felt sure that he had swallowed it in an embryo state, years before, in India, and that he would never be well until the reptile was by some means expelled. He was a man of ruddy complexion, and of nearly two hundred pounds avoirdupois, which induced me to tell him that serpents must agree with him, and that, if he could swallow four or five more, he would live a thousand years. He assured me he could not be mistaken, and that he had hope that the water of a certain spring would insure his recovery. After tasting of that particular spring, I expressed my conviction that no well-regulated snake would endure being deluged by such an obnoxious liquid day after day, and that his frequent draughts, without any result, proved conclusively that the reptile was in his mind, and not in his stomach. This style of bantering seemed to please him, and when I made it clear to him that I was not a professional physician, he was willing to follow my advice. I urged him to give up doctors and medicines of every sort; to take a great deal of exercise, and to cease thinking of himself

as a valetudinarian. He promised to follow my prescription for six months, and the ensuing winter I met him again in Naples, a radically changed man. He had cleared his brain of all its cobwebs, and thanked me heartily for the sagacious course I had recommended. "I am delighted to know," he added, "that you are not a physician, for if you were, you couldn't help being a fool."

The stout women on the shady side of life who visit the springs under the impression that they are ailing are extremely amusing. They must know they are shams; but they imagine that it is genteel and attractive to be delicate; and so, notwithstanding their excellent appetite and liberal proportions, they insist they are going into decline, when their chief danger is from apoplexy. They will entertain you by the hour with their lack of appetite, their loss of sleep, and their extreme fragility. You may credit their story unless you happen to see them at dinner, or hear them sleeping audibly on the sofa soon after, or find them performing social duties which would tire out Samson.

L.

GAMING AND GAMESTERS ABROAD.

FOREIGN AND DOMESTIC SUMMER RESORTS. — THE ADVANTAGE OF THE FORMER. — MYSTERIOUS CHARACTERS. — A TRIO OF CELEBRATED GAMESTERS. — THEIR EXTRAORDINARY HISTORY. — TRAGIC FATE OF A YOUNG RUSSIAN OFFICER. — TEMPTATION, DESPAIR, AND SUICIDE OF A BEAUTIFUL ENGLISH GIRL. — A LUCKY BANKER'S CLERK. — A HUNGARIAN HANGING HIMSELF FOR A WARNING. — ECCENTRICITIES OF CROUPIERS. — A CALM-BLOODED HOLLANDER. — THE SKELETON IN THE CLOSET. — ROSE-STREWN ROADS TO RUIN.

FOR mere recreation and pleasure the foreign watering-places have great advantages over those at home. Saratoga cannot be compared to Baden any more than Long Branch to Biarritz. The promenades and promenaders beyond the sea have far more pleasantness and variety; the scenery is more picturesque, and the general comfort and satisfaction immeasurably greater. There is much less of that desire of one to outdo the other, much less feverish unrest, much less ambition and anxiety for display. Each person lives according to his or her means; has no heart-burnings or envy on account of people in more fortunate circumstances. The gardens of the spas are delightful, and when the bands play, as they do at stated intervals, and the fountains flash in the sunbeams or the moonlight, and the gay throng passes to and fro, and easy prattle is interspersed with merriment and laughter, all the externals for enjoyment are furnished. The promenades, like the gaming saloons, are as a gay masquerade. On them and in them are men and women of every grade, and they all mingle together, though without recognition, as a well-dressed and well-bred democracy. Balls and concerts are given every week; and these, with dining, and wining,

and driving, and flirting, and the countless follies and jollities of fashionable life, make the season pass swiftly in one round of delicate dissipation and refined revelry. Such extremes and excesses as we have are not observable there. The social tone is more elegant although a fairer outside may conceal darker and deeper deeps. To an observer and student of human nature, the German spas are certainly more attractive and retentive than our own summer resorts. They do not weary you after a few days, or weeks at most, but draw you back to them year after year with a freshness of flavor and the spice of a new zest.

This continuity of charm is shown by the large number of regular habitués which each of the four springs has. I have met at Baden and Wiesbaden elderly couples who had been coming there since their early marriage, and who regarded the places and the play as indispensable to their contentment. You see there, season after season, mysterious characters that you never see anywhere else, — men apparently wealthy, with fine manners and a grand air, who, for aught you know to the contrary, may be pirates or highwaymen. Eccentric women flock there, too, about whom there are endless rumors, but no authentic information. They may be duchesses or demi-mondists, actresses or adventuresses, leaders of the ton or ladies of the sidewalk. So long as they conduct themselves properly, no one cares to inquire who they are or whence they come. The atmosphere of the Taunus and the Black Forest is free, and not a taint of Puritanism is in it. They whose position is fixed are so much assured thereof that they do not fear any passing wind which may blow between them and their nobility.

One of the oldest known frequenters of Homburg is the Countess Kisselef, the former wife of the Russian minister to Rome. She was never missed a season for forty years, and recently she has been a permanent resident of the little capital. She must be seventy now; is so broken in health, and infirm of body, that she is forced to hobble about with a cane and a crutch. Age and debility have not, however, lessened

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ıer passion for roulette, the only game she plays. Her pas-ion for it is ineradicable, and the story is, that her husband ong ago separated from her because she would not give up gambling, to which she devoted the greater part of her in-ome. Having married her, it is said, for her fortune, — riginally several millions of roubles, — he was angry that he should risk at the tables what he wished to use for him-elf. Her losses are reported to have been immense, — I have ıeard them estimated at a million and a half of dollars, — nd yet she has quite enough left to enable her to bet freely n the Cursaal. Her gray hair, aquiline nose, sharp chin, nd large and crippled figure are familiar to everybody. She s usually one of the first persons seated at the table, and ome minutes before eleven o'clock you may see her helped nto the room by the lackeys, or some of her own servants. She occupies a particular chair, and she is always in it, except when she goes to dinner and to sleep; taking no rest even n Sunday, when the game is generally more animated than n any other day.

The countess is very much attached to Homburg, where he has put up many handsome buildings, opened several ew streets, and in many ways contributed to its improve-nent. Exceedingly homely as she is now, — she reminds me f a feminine grenadier wounded in different campaigns, — he is reputed to have been beautiful once, and to have been fascinating and dangerous coquette. Such tales are told of early all women known in society who are noticeably ugly nd obese. I can't believe that the Countess Kisselef could ver have been charming. I should sooner expect her to reak the bank at Homburg ten times a day in her present ld age, than think it possible for her to have broken a mas-uline heart in all the freshness of her youth. A woman of er form and feature might be formidable as a foe, but never erilous as a friend. The aged countess has had her obituary ritten several times, but she was still alive, and still watch-ng the ivory ball, the last season, and will be, I am sure, or many seasons to come. [The gambling tables were closed

last year because the license expired with 1872, and the countess can hardly survive. Roulette has so long been her sustenance that she must perish if deprived of it for many seasons.]

The Princess Suvarroff, also a Russian, is one of the notabilities of Baden. Her career, if report be true, must have been eventful. A native of Siberia, she went to St. Petersburg while very young, and her father occupying a high position in the army, she was received into the best society, and, by her beauty, grace, and accomplishments, soon became the centre of a large and admiring circle. She had lovers by the dozen; and although many men of rank sued for her hand, she refused every offer, declaring she preferred freedom to the highest title and the largest income. At last the Czar, wishing to perpetuate the name of Suvarroff, then dependent on a single scion, — the prince of that name, — urgently requested that she should take the prince for a husband. The imperial request is equivalent to a command, and the charming flirt, unwilling to forfeit the favor of the court, consented, even with the knowledge that her husband would be her husband only in name. She has since had several children; and though their paternity is not easily traceable, they are called Suvarroffs, and the object of the Czar is therefore attained. The princess has had, and still has, all the liberty she could desire. She goes where she chooses, and does what she likes. Baden is her favorite resort, and *rouge-et-noir* her favorite pastime. She has been remarkably successful in her ventures, being one of the very few players who have won more than they have lost. Her reputation for luck has long been established, and the consequence is, she is perpetually asked to place the money of others upon the green cloth, which she often does, as she is extremely good-natured and obliging. Considerably over forty now, she is still handsome, and her ease and grace of manner, with her richness of attire, indifference to conventionality, and brilliancy of conversation, render her noticeable at all times and in all places.

Señor Garcia, one of the most renowned of Continental gamesters, and one of the lions of the spas, died very recently in Geneva, bankrupt in hope and fortune. He was born at Saragossa, of a good Spanish family, and inherited large wealth at his maturity. This he wasted in dissipation, materially assisted by his fondness for *trente-et-quarante*. He afterwards inherited some twenty thousand francs by the death of a relative in France, and, with this as a stake, he won nearly two millions of dollars. For several years he lived luxuriously, driving the finest of horses, wearing the rarest of diamonds, giving the superbest of dinners. His turnouts were conspicuous in all the capitals of Europe, and, though he spent money like Fortunatus, there seemed to be no end to his wealth. No one in this generation has broken the bank of Baden so often, and *tailleurs* at *rouge-et-noir* really feared him, so unprecedented had been his successes. His luck deserted him at last, and he lost in the Conversationshaus the last florin he had been able to borrow.

He then went to Monaco, and became a waiter at a fashionable restaurant; but whenever he had a few francs in his purse, he laid them on the table which had swallowed up his riches. His lofty air in the restaurant at Monaco first directed my attention to him, and caused the remark that he had the manners of a prince in the person of a servant. Informed of his antecedents, I no longer wondered that his appearance was above his station. He was a great favorite of the patrons of the establishment where he was employed, and the gratuities bestowed upon him were large and frequent. He received them, I remember, as if it were a condescension on his part, and as if the givers ought to be eternally grateful to him for his generous acceptance. He made numerous efforts to propitiate the goddess who had deserted him, but she was as obdurate as a woman whose vanity had been wounded. After various shifts, he breathed his last in miserable lodgings, leaving behind him but twenty sous as a mournful memento of his dangerous vice and his once splendid fortune. The close of his career conveys its

own moral. He died as most games
have been their occasional prosperity -
robbed of his gains, derided by destiny

Garcia had more philosophy than
They who lose everything, after h
tain time successful, are often so dee
changed condition that they commit s

Self-destruction is something the v
holy horror of, for it clearly illustrate
gambling, and has a tendency to di
from betting liberally. The Directio
vedi, of course, how many men hang
selves, after being ruined at *roulette*
will only be obliging enough to die
the face of the public. Every once
whose last stake the *croupier* has r
beautiful gardens in the rear of the
blows out his brains, because he belie
is more to be dreaded than an occupie

Two or three years ago, a young R
of a highly influential family, came
the summer. He had never touched
not know one from another, — and wa
well with the pleasant acquaintance
when an Italian lady, who had been u
day, in the Cursaal, to bet a few napo
faith, inasmuch as he was entirely un
of any sort, that he might turn the ti
was too gallant to refuse, and, as it ha
in less than half an hour two hundr
understanding a single rule of the gam
if she was satisfied, and she replied i
quitted the saloon, determined neve
account. He misunderstood himself.
and restless night, and in the morning
bly to the tables. If he could have
another, why should he not have it

haunted at once by visions of wealth, and he no longer had the power to resist the tempter.

The young officer took his place at the table, and did not rise from his chair until eleven o'clock that night — the regular hour of closing. He was then ahead of the game nearly one thousand dollars, and the demon of avarice was fully aroused in his soul. Another feverish and restless night, and again the morning found him at his post. For several days he played with varying success, and at the end of a fortnight he had lost all he had, and had drawn the last frane from his bankers in Paris. He then borrowed a considerable sum from his friends at Baden, and that went with the rest. Excitement, and the unusual quantity of wine he had drank, had maddened him. His sole thought and desire was to get more money for play.

In a moment of weakness and frenzy, he forged the name of a wealthy cousin in Moscow upon a bank in St. Petersburg, and asked an acquaintance, to whom he had brought letters of introduction, to cash it for accommodation. The request was granted as soon as made. The Russian hurried to the Conversationshaus, confident that he would win enough to take up the draft, which he had expressed a desire that his friend would hold for a day or two, as he might in the meantime receive a remittance from his father.

The fates were hostile. When the officer laid his wager on black, the red won; and when he trusted the red, the black triumphed.

In three hours the entire amount of the draft had melted away. Ruin stared him in the face, — not only financial ruin, but ruin to his good name, his honor, his self-esteem, which he had prized more than life itself. Hopeful as he had been, he had prepared himself for such a desperate emergency. He had a small Deringer pistol in his pocket, and rising from the table, and stepping back two or three paces, he put it closely to his heart, and pulled the trigger.

The *galerie*, intent on the game, did not notice his movement and the first intimation it had of anything unusual was

the report of the weapon and the heavy fall of the officer on the floor. The ruined gamester gasped twice or thrice, and his life went out with the blood that crimsoned his bosom.

The players — some of them, at least — were startled for a moment; several of the ladies shrieked, and one, an American, swooned. The *tailleur* and the *croupiers* looked on unmoved, and expressed some surprise that the young man had not been polite enough to step into the garden before shooting himself. The *tailleur* announced that the game would be suspended for half an hour. In that time the body was removed, the blood washed away, and the eternal *Faites votre jeu, messieurs; le jeu est fait; rien ne va plus*, was croaked out once more; the cards were laid, and the coin pushed over, or raked in by the solemnly silent *croupier*.

Women, with the retiring modesty that belongs to their sex, seldom make an exhibition of themselves, even when they are the heroines of their own tragedy.

At Ems, recently, a young English lady of family became engaged to a gentleman in her own grade of life, who could not bear the idea of women gambling. She had been at the baths for several seasons with her father; had frequently staked money at the tables, and had formed a strong attachment thereto. Her father was aware that she played sometimes for amusement, but never suspected how much of a fascination the game had for her. Unknown to him, she had pawned her jewels to obtain money to hazard at *rouge-et-noir*.

After her engagement, her lover told her how much he was shocked to see any members of her sex degrade themselves by gaming, and added that, much as he cherished her, he would rather behold her dead than receiving a fortune from the hands of a *croupier*. Deeply impressed by the earnestness of his words, she resolved never again to take any part in the dangerous excitement. For weeks she adhered to her resolution; but, one evening, while strolling through the Curhaus, she so far forgot herself as to venture a napoleon, and, winning that, to venture and to lose twenty

more. For three days she continued to bet secretly, and at the end of the time felt convinced the passion was too strong to be surrendered. Such self-knowledge was terrible indeed, and so deep was her mental distress that she determined to live no longer. Purchasing a vial of laudanum, she went to her own room, and writing a letter to her affianced husband, in which she made a full confession of what she had done, and of the unendurable misery her conduct had caused her, she swallowed the poison, and was found, the next morning, dead in her bed. Her affianced lover was overwhelmed with sorrow, and protested that he should never more know an hour's peace.

This proved to be only masculine hyperbole, for he was married two years after, and appeared, judging by outward signs, one of the most contented and self-satisfied of men.

All this perilous wooing of fortune does not always lead to tragedy. A young man, residing in Frankfort, who had only his salary as a banker's clerk to live upon, fell in love with a prosperous merchant's daughter, and his attachment was fully reciprocated. The rich papa, as commonly happens, was unwilling to have a poor son-in-law, and so refused his consent point blank to the union. Entreaties were vain; his daughter's tears moved him not a whit. He informed the young man that he would give him three years to achieve pecuniary independence in, and if he did not succeed, he must, at the end of that period, abandon all hope of the girl's hand. In America fortunes are suddenly made: but in Germany, where everything runs in grooves, there is hardly a possibility of earning much money, unaided by capital or powerful influence. For twenty-four months Romeo struggled for his prize, but struggled in vain. He had succeeded in saving only about five hundred dollars: and, knowing this would be considered a contemptible sum by the merchant, he felt that he would be forced to give up all claim to the woman he adored.

Falling asleep, one night, with this subject upon his mind, he dreamed of going to Homburg and increasing his little

store tenfold. On awakening, he considered his dream prophetic. He visited Homburg, placed his all upon "color" again and again, and each time "color" won. His five hundred dollars he increased to ten thousand; returned to Franfort; procured papa's consent; married the girl, and, as the story goes, has never since been known to risk a florin on a game of chance. So even gambling, great evil as it is, sometimes does good; though instances like this are extremely rare.

A Hungarian merchant from Pesth came to a melancholy end at Baden, a few years ago. He had been to London on business, and on his way home thought he would spend some days at the baths, where a number of his friends were staying. He had scarcely arrived there when he began at *rouge-et-noir* with a few florins, not having the least intention of playing largely. Like hundreds of others before him, he was drawn into the dangerous rapids before he was well aware of it. He lost not only the money he had with him, but drew on his own firm, obtained advances on his letters of credit, and at the end of a week was absolutely ruined. He had a wife and six children at home, and had not the moral courage to apprise them that they were beggars, to make a resolution never to play more, and commence life anew. Wishing, however, that his fate might be a warning to others, he went late at night to the promenade in front of the Conversations-haus, and when the little town was quiet and asleep, he placed a large placard upon his breast and hanged himself before the main entrance to the beautiful building. The placard, written in French, ran thus: —

"Here am I, a Victim of Gambling!
Take Warning by me, and never Enter this Hell!
The Man who Plays Damns his Soul Forever!
Don't Deceive Yourself! Bet Once, and You are Lost!
The Doors of this Saloon are the Gates of Death."

The bathers and water-drinkers, sallying forth early, were shocked to see the unfortunate gentleman suspended by the

neck, and to read what he had so truthfully written. The Direction, indignant at what they considered a breach of etiquette, lost no time in removing the corpse, which furnished such a sad commentary on their perfidious entertainment. Before breakfast everybody knew of the tragedy, and it had such an effect upon the patrons of the bank that the tables, for two or three days, were very thinly attended. The Direction felt sorely troubled respecting the unpleasant circumstance, as they termed it, and industriously circulated the report that there was no truth in the story of the Hungarian suicide; that he had really left for Basle the day previous to his reported self-destruction; that the figure found hanging was merely an effigy placed there by some mischievous jesters, against whom legal proceedings would be begun forthwith. Strangely enough, this invention was believed. The players returned in full force, and the warning of the Hungarian was lost, as a thousand other warnings have been lost before.

If the private history of the four gaming places could be learned, with all the evils resulting from them, the record would be ghastly and hideous indeed. It is only now and then that an intimation of the great injury they do comes to the surface; and if any considerable part of it were known, the springs would be avoided like lazar-houses. A stoical pride is generally practised by the habitués who have suffered financially; and I have observed many men, and not a few women, turn away from the tables with a forced smile, when I knew that they were undergoing excruciating torture.

Losing money which one cannot afford to lose brings with it a train of social, mental, and moral ills that cannot be fully estimated. Could a thousandth part of the woes wrought by the demon of chance be depicted on those frescoed and gilded walls, they would equal the torments ascribed by gloomy priests to the doomed and damned in the fiery pit.

The outside of the temples of fortune is dazzlingly attractive; but, passing beyond the portals, and lifting the purple

veil, such anguish and agony are apparent as may well appall the stoutest heart.

Some men are so methodical and cool-blooded that they are proof against the seductions of *roulette* and *rouge-et-noir.* They can make up their mind beforehand as to how much they will lose, and never risk another florin. These, however, are exceptions to human nature, and no ordinary mortal can hope to imitate them with any prospect of success.

A sturdy Dutch banker from Amsterdam is in the habit of visiting one of the spas every season, and always bets within a certain limit. Four thousand florins is the sum he feels able to lose annually, and this being gone, nothing prompts him to risk any more. Sometimes he loses this in a few days, sometimes not for weeks, sometimes not at all. Whatever he may gain does not count, as he feels privileged to do as he chooses with his winnings, but having parted at the tables with four thousand florins less than he had on his arrival, he is bidden in vain to make his game. He told me once that he fancied he was a good deal ahead of the tables, but having made an exact calculation, he found that in ten years all he had won was fifteen florins.

The *croupiers* are a singular class. Nearly all of them have, some time or other, belonged to the *galerie*, and, as may be imagined from their position, have wrecked themselves on the uncertain sea of hazard.

The last season I was at Homburg, six of the *croupiers* there had histories. One of them was the son of a coffee planter of Brazil. He had fallen into some serious trouble in Rio Janeiro, and had gone to Lisbon, where he led such a prodigal life, and drew on his father so frequently, that the old gentleman refused to honor his drafts further. The young scapegrace then went to Italy, served in the Papal army, afterwards became a sailor, travelled all through the Orient, earned considerable money by trading, went back to the Continent, visited Baden, arrayed himself against the tables, was rendered penniless, and in his desperate strait was appointed *croupier.*

A second of this fraternity had been a Malay pirate, it was whispered, and also a monk in Palermo; then a *valet de place*, and finally a brother of the rake.

The third informed me he had been a Greek priest, but, having been suspected of conspiring against the Emperor of Russia, he was sent to Siberia, whence he escaped and entered upon his present calling.

A fourth, a Hebrew, once kept a pawnbroking shop in Chatham Street, and was sentenced to Sing Sing on a charge of forgery, served two years, inherited some money left him by an uncle in Prague, became a victim to play, and at last had the satisfaction of getting on the right side of the table.

The fifth *croupier*, a Frenchman, had emigrated to California in 1849, and, as a member of the sporting fraternity, narrowly escaped hanging by a mob, some years after. Floating from point to point, he stranded at Baden, and will doubtless die there.

The sixth began his career as a reporter on a Berlin journal; served in the Prussian army; studied law, medicine, and theology, but could never practise anything save gambling. "I always lose," he said to me; "and having no more money to risk, I have the satisfaction now of seeing other persons make as great fools of themselves as I have made myself."

Hundreds of chapters might be written on the gambling hells of Germany, for the subject is inexhaustible. But each and all of them, if truthful, would show that the spas, like the Dead Sea apples, are attractive to the sight, but ashes and bitterness within. The players are handsome makers. They laugh, and dance, and seem happy; but when the masks and dominos are removed, the bodies are leprous, their touch contagion, their soft caress a lingering and loathsome death.

LI.

SUBTERRANEAN DWELLINGS.

EARLIEST HABITATIONS. — UNDERGROUND HOUSES. — A DWELLING ON THE AMERICAN PLAINS. — HOW AN EARTH HOUSE IS MADE. — RESULT OF A NIGHT IN IT. — ARCTIC DWELLINGS. — A MANSION IN KAMCHATKA. — ITS ADVANTAGES AND DISADVANTAGES. — A CHIMNEY AND DOORWAY IN COMMON. — THE AUTHOR'S EXPERIENCE. — A LIVE DOG IN A STEW-KETTLE. — THE STORY OF GAMOOT. — HOW HE ENTERTAINED HIS FRIENDS. — FISH-OIL PUNCH AND A CANDLE BREAKFAST. — HOW HE LEARNED ENGLISH. — NEW MODE OF BOXING THE COMPASS. — GAMOOT'S MELANCHOLY FATE.

THE climate of the Garden of Eden was of such a temperature, and the customs of Adam and Eve, before their famous fruit-gathering excursion, were of such a primitive character, that no dwellings were needed. It is not known that the weather ever compelled Adam and Eve to seek shelter, and they had no prying neighbors to disturb them; but, after the abandonment of the garden, it became necessary for them and their followers to have places of shelter. The first habitations were, probably, holes in the ground. The historians generally agree that the primitive habitations of the savage partake more or less of a subterranean character. At the present day there are many tribes of people that live wholly or partially under ground. Dwellings thus made are easy of construction, especially in regions where timber is not abundant, and the facilities for working in stone do not abound.

In the far west, between the Mississippi River and the Rocky Mountains, there are many underground, or partly underground, dwellings, inhabited, not by savages, but by white men. Dwellings of this sort are not particularly dry, but they are generally cool, and, if one does not mind a little

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dampness, they are quite comfortable. My first experience with one of these habitations was not entirely agreeable. I had been travelling for several days, and sleeping at night under the shelter of a wagon. My bed was airy, and the only protection the wagon gave me was to keep away the dew, and prevent wandering mules and oxen from running over me. My health was excellent, and I was beginning to consider a house a superfluity.

We found a party of men living in one of these houses, where there was no wood for a long distance, or but very little of it, and they had dug out a place under ground, covered it with a roof consisting of poles, bushes, and turf, and were making themselves comfortable. They urged me to share their hospitality, and I did so, abandoning my wagon for the shelter of their roof. In the morning I awoke with one of the worst colds I ever had in my life, and for several days I had a very disagreeable and intimate acquaintance with a sore throat.

In the northern part of America and Asia the dwellings of the aboriginals are constructed partly under ground. A hole is dug in the earth four or five feet deep, and a rude roof of poles and earth is placed over it. The Greenlanders and the Esquimaux generally enter their dwellings by a long passage-way, so low that one must creep on his hands and knees, and it is so narrow that a stranger cannot easily turn round in it. In Kamchatka the natives have a similar dwelling. Some tribes enter their houses at the side by a passage-way, somewhat like the entrance to an Esquimaux dwelling. Other tribes enter through the centre of the roof, going down through a hole which serves for a chimney.

After an experience of both kinds of entrances, I greatly prefer the Esquimaux'. In North-eastern Siberia it was my fortune to be thrown among the Koraks, a people whose dwellings have only one place to serve as a door and chimney. The fire is directly beneath this hole. It is generally burning in winter with considerable briskness, and almost always has a pot of reindeer meat over it. When you accept

the hospitality of a Korak, you descend into this hole by means of a pole with notches in its side, on which you must cling with feet and hands. A blast of hot, blinding smoke rises in your face, and, as you descend, it grows hotter and hotter. By the time you are within two feet of the bottom, you can scarcely breathe. When you think you are nearing the bottom, you must jump from the pole, and you are just as likely to jump into the fire as you are to jump from it. At my first experience I did not jump fairly into the fire, but so close to it that my feet came very near being singed.

Every Korak habitation supports a large number of dogs, which are used for draught purposes. The dogs are not admitted to the private quarters of the family, but are compelled to stay outside. They content themselves with hanging round the hole in the roof, and look down in the inside, sniffing the venison that is below. Occasionally they get to fighting near the hole, and one of them drops through. Sometimes he drops into the fire, and sometimes into the pot of meat, and makes a commotion. He yells a good deal in either case. If he has fallen into the fire, he is taken by the neck and swung up again through the chimney. If he falls into the stew-pot, he is taken out, howling all the while like a congress of chimpanzees, the broth is squeezed out of his shaggy hide, so that it shall not be lost, and then he is thrown up into the open air. The natives do not appear to have any pity for the dog, and the fact that he has been soused in the dinner pot does not in the least affect their appetites. They swallow the stewed venison with just the same relish as they would if it contained no dog's hairs to thicken the mess and get between their teeth.

In these northern regions the weather is exceedingly cold. On the coast of the Arctic Ocean, far inside the polar circle, the sun frequently forgets itself, and for days and weeks in summer behaves like a masculine chicken, and never sets. In winter it also forgets itself, and not only sets, but stays set for a longer time than the most respectable hen that was ever known. It would be inconvenient to publish a daily news-

paper there, for the reason that some of the days are not more than fifteen minutes long, while others are three or four months. And the same is the case with the nights, which are sometimes stretched out to an inconvenient length. They would be jolly for courtships and for evening parties; but it would not be advisable, in the middle of one of the best of those nights, to sing "We won't go home till morning," and then fall to drinking hot punches and things every ten minutes, "till daylight doth appear."

Those long nights are a great delusion to a man who thinks it will be capital sport to lie abed until late in the morning. If he goes to bed with a determination to make a night of it, he finds that he does not sleep straight through, but has to get up a good many times before morning to have his hair dressed, and to get on the outside of that edible conglomerate known as hash. If he should try to get through the night without eating or drinking, the probabilities are that he would furnish a job for a hyperborean undertaker in consequence of early starvation; but it would be equally inconvenient to attempt to stay out of bed all day, as a great many people insist upon doing in this part of the world. A nap would be necessary after breakfast and after dinner, at all events, and I shrewdly suspect that the most of us, if we lived there, would have many breakfasts and dinners between sunrise and sunset.

It would delight John B. Gough or Father Mathew to have an old toper go away up north in summer, and take only one drink a day; and if he took it in the shape of an appetizer before breakfast, it would give him a splendid appetite by the time he sat down to his toast and steak, provided the day was laid out for only one allowance of breakfast, dinner, and supper.

In describing life in this region of ice, and snow, and underground dwellings, I propose to do it by narrating the adventures of a mythical native, whom I will call Gamoot. He owned a brown stone front, about latitude seventy-five degrees north, longitude two hundred and fifty degrees east, where his nearest neighbor was a polar bear, and he looked

out of his bay window upon a cheerful scene of icebergs, and all that sort of thing. His brown stone front was made of ice, built over a hole in the ground, and looked like one of the piles of hay that the farmers make in the field, before they drive round with the cart. The front door was a slab of ice, and, when you had rung the bell and sent up your card, you dropped on your hands and knees, and went in. The hall was twenty feet long, and about two feet high and wide; it made a couple of turns, and one of them was a sharp angle, like the corner of a dry goods box. You went inside the house, and had to twist yourself round the corner of the hall, like a big steamboat going up the Red River. You had to work your way along very much as an eel goes through a water-pipe. Gamoot did not ventilate his hall very well, and if you were a new comer, it was quite possible for you to imagine that you had mistaken the entrance, and gone into the sewer instead of the fashionable doorway.

It was inconvenient sometimes, when you were about mid-way of the hall, creeping along ever so nice, and just doubling the sharp corner,—it was inconvenient, I say, to meet one of Gamoot's big dogs on his way out. Gamoot's dogs were an independent lot of pups, with appetites like mill-hoppers and teeth like cross-cut saws. When they made up their minds to go out, they generally went, and if anybody was in the way, it was healthier for him to go ashore than to stay there. Gamoot used to apologize for his dogs, and say that their conduct was owing to their breeding, as they were half wolf and the rest ugliness. I used to wish that they had been of a different breed.

But if you happened to get into Gamoot's house without being interviewed by his dogs, you were sure to be interviewed by the whole family as soon as you reached the parlor. The *grand salon* was about twenty feet across, and was high enough to allow Gamoot to lie down, which he did very often. The only way you could stand erect was by sitting down on the floor, and standing in sections. By sitting down you could hold your head and body in a perpendicular posi-

tion, or by lying on your back you could stick up your feet and legs. The latter position was considered ungraceful, and was not generally practised by visitors. The house was ventilated through the hall, which was always kept closed. The atmosphere was about as thick as an invalid's gruel, and sometimes it became so tough and hard that visitors used to break off pieces of it to carry away as *souvenirs*. Gamoot had a pan which he used to fill with fish-oil, and then put a wick in it. This pan served as chandelier, furnace, and everything of the sort. Sometimes the children fell into it, but it did not burn them, though they soaked up a frightful lot of grease.

Sometimes, when Gamoot had company that he wanted to get rid of, he used to take a bottle out of doors, and fill it with fresh air. He would then return, and hold it to the nose of each visitor. He would then point to the cheerful hall-way: the two movements were understood to mean that there was more of the same sort outside, and that the visitors had better be sniffing it. The gentle hint was generally understood, and the visitor, after looking to see that the dogs were all inside, and not likely to be met in the hall, politely bade Gamoot adieu, kissed Mrs. Gamoot, the children, and the dogs, and departed.

Gamoot was as hospitable as a Dutch uncle. He used to keep a barrel of fish-oil and a box of candles on draught in one corner of his study and smoking-room. Whenever you called, he would mix you a fish-oil punch: and O, such a punch! It is enough to make one's mouth oil to think of it! Then he would hand you a candle, just as your Boston entertainer would hand you a cracker; and he not only handed you a candle, but he took one himself. It was a pleasure to see him, with a tin glass of oil punch in one hand and a candle in the other, and as fast as he took a sip at the candle, he took a bite at the punch; and it was not the polite thing to refuse either one or the other. Gamoot used to resent a refusal, and he had a pleasant way of taking you by the back of the neck, and squeezing you till your mouth opened.

Then he would drive the candle down your throat with a mallet that he kept for the purpose, and he would pour the punch after it with a funnel. Knowing his playful eccentricities, it was always better to take your punch and candle without making a fuss.

It may be inferred that Gamoot was an uncivilized savage; but he was not. He had met white men who visited the polar regions in pursuit of whales. He had learned from these aristocrats something of the language and customs of civilization. He had no knowledge of sacred history; but, to judge from the style of his speech, he was well versed in profane history. He knew most of the parts of speech in the English language that are addressed to disobedient sailors by their captains and first and second mates; and on one occasion a shipwrecked mariner offered to educate Gamoot in English for his board and lodging. Gamoot accepted, and they went to work.

"I will teach the bloody Injin to box the compass," said the mariner to himself.

"Come here, blame your eyes!" said the mariner to Gamoot; only he used another word, which I do not exactly recall, in place of "blame."

The mariner had saved a compass, and as Gamoot stood over it, Jack placed his finger on the "points," and named them over. But instead of giving their names as they are known to nautical sailors, he applied an oath to each of them: and he varied the oaths, so that by the time the compass was boxed, he had uttered a lot of profanity that would make an Arkansas stage-driver break his heart for joy.

Gamoot was a good scholar, and learned his lesson well. He used to repeat it to visitors, and was as proud of it as a poodle dog is of the ribbons in his ears. He always gave great delight to the strangers, especially if they happened to be chaplains of whale-ships, or missionaries on the hunt for converts. To enter his house, take an oil punch and an appetizing candle, and hear his melodious voice box the compass in the way he had been taught, was a delight that few persons ever enjoyed.

But one day, when the bark Susan Maria touched near Gamoot's mansion for salt, water, and provisions, the hospitable gentleman went to the beach to welcome the crew, and look out for a chance to steal something. By accident he picked up an oar, and was walking off with it, for fear it might be lost. One of the sailors addressed Gamoot in language much like boxing the compass, and the innocent aboriginal supposed the briny navigator was repeating his lesson. The first mate, who had charge of the boat, repeated the address, and added something which implied that the dog-star presided at the birth of Gamoot. This phrase was also familiar to the native, and he paid no attention to it.

The mate then proceeded to give Gamoot a gentle hint, which he did by throwing a harpoon through him. The point of the instrument entered between the brown-skinned gentleman's shoulders, and came out in front of his heart, after dividing that organ into unequal parts. The boat-steerer then gave an additional hint by throwing a bomb-lance, which exploded in Gamoot's head, and interfered seriously with future repetitions of his lesson in navigation.

Gamoot subsequently died of his injuries. His romantic career has passed into poesy, and the story of his house, his punches, his candles, his linguistic researches, and his unfortunate harpooning is sung wherever he was known.

LII.

BRIGANDAGE AS A FINE ART.

HIGHWAY ROBBERY IN MODERN TIMES. — THE OLD WORLD AND THE NEW CONTRASTED. — HABITS OF RUSSIAN ROBBERS. — PIOUS THIEVES. — PRAYERS FOR SUCCESS. — ROAD AGENTS. — CRUELTIES OF ITALIAN BRIGANDS. — TORTURE AND RANSOM OF PRISONERS. — SPANISH BRIGANDS. — ADVENTURE ON A SPANISH ROAD. — AN AMERICAN PRINCE AND AN ENGLISH DUCHESS. — AN EXCITING RACE. — A DUCHESS IN UNDRESS.

BRIGANDAGE is rapidly becoming a thing of the past in most parts of Europe, thanks to the introduction of railways, and the gradual abolition of the mail coach and diligence. In France it occurs so rarely as to cause general comment whenever an instance is reported; and in Prussia and Austria one can travel, with little danger of highway robbery, from one end of the country to the other. Russia, which has few railways, has more cases of brigandage than its western neighbors, though the government always deals very severely with robbers when it catches them. Travellers in the eastern and southern parts of the Muscovite empire frequently encounter robbers on their route, and give up their purses with as good grace as they can muster. There is a law in Russia that forbids one to fire upon robbers, unless they outnumber him three to one; but as a man who is attacked can usually make conscientious oath that he thought his assailants very numerous, he is generally excused for any violation of the statute in such cases made and provided.

The land to which most of the Russian convicts are banished, Siberia, is, curiously enough, less dangerous for a traveller than the European possessions of the czar. In a land journey of five thousand miles, in Northern Asia, I was never

disturbed by footpads, and suffered no apprehension. Had my tour been in midsummer, there would have been less security; but as it occurred in winter, when the thermometer frequently reached forty degrees below zero, the circumstances were not favorable to lying in wait for several hours, when the prospect was good that the highwayman would freeze to death before he could find some one on whom to try his skill.

Of all European countries, Italy is the one at present whose sculpture, begging, painting, and highway robbery have attained the highest stage of perfection. In the southern part of the kingdom robberies are of frequent occurrence, and the mountains are full of bands, that have a regular organization for plundering travellers. Sometimes the scoundrels add murder to robbery, and they have a pleasant way of holding men for ransom. If the ransom money does not come as promptly as they desire, they detach a prisoner's ear, and send it as a gentle hint for his friends to hurry up. If the ransom is still delayed, the other ear follows, then a finger, and so on, until the unfortunate traveller is about as much his former self as Hamlet without Hamlet.

The Italian brigands are a pious lot of thieves, and when they set out on a marauding expedition, they generally offer up prayers for a successful result. Russian robbers are equally devout. There is a story of a Muscovite highwayman, who one day killed a traveller, and, while rifling his pockets, discovered a cake containing meat. Though very hungry, he could not eat the cake, as the church fast then prevailing forbade the use of meat. The King of Italy has made very earnest efforts to suppress brigandage in his dominions; but he has not succeeded, partly on account of the pope declining to coöperate with him as fully as he desires, and partly owing to the fondness of the inhabitants for a wild life. The Ex-King of Naples, who resided in Rome until quite recently, was well known to be in league with the brigands, whom he hoped at some time to make the nucleus of an army in case he should deem it prudent to endeavor to regain his throne. Men who

had been plundered on the roads of Southern Italy told me that they afterwards met their robbers on the Corso, or in the Piazza di Spagna, and saw them enter and leave the house of Ex-King Ferdinand.

The most prosperous [illegible] of the United States, in the matter of brigandage, as [illegible] re stated, are the new states and territories west of t[illegible]ssouri River. In Montana, Idaho, Nevada, and Cal[illegible]rnia, highway robberies are frequent; and it is sometim[illegible] the custom for the stage companies to supply passenge[illegible]th rifles for their protection. But the robbers generally [illegible]e the opportunity to approach when least expected, and in many cases they do not trouble the passengers, but content themselves with the treasure in charge of the express messenger. Generally the messenger shows fight, if the driver does not, and in some instances the robbers have paid dearly for their attempt. They are well armed, and the passengers usually find it best to submit, and hand over their money without grumbling. The Californians speak of these robbers as "road agents," and I was much amused at the name the first time I heard it. I was starting from Stockton for Mariposa, and some one suggested, as I mounted to the outside of the coach, that the road agents might trouble us. I innocently asked if we were obliged to pay the tolls on the road, and suggested that the duty belonged to the company. There was a general laugh at my expense, as a fellow-passenger explained to me what a road agent was.

Spain can boast a fair allowance of brigands, though not as many as she could twenty years ago, on account of the construction of railways along the principal routes of travel. Probably the present troubles will leave the country in a very disordered condition, and for years to come there will be many men seeking their living by plundering others. The Spanish robbers are no less cruel than their Italian brethren, and they regard human life as of very little consequence. They do not hesitate to kill their victims when they think they will endanger their safety by leaving them alive. Mexico, Cuba, and the South American countries in general, copy

the customs of the people who colonized them, and especially in Mexico robbery is considered one of the fine arts. Many wealthy people are not exempt from the suspicion of having acquired their property by foul means; and not unfrequently some of the high officers of the government are known to connive at the exploits of Mexican Jack Sheppards and Claude Duvals.

A few years ago a gentleman of my acquaintance had a curious adventure in Spain, which I will endeavor to relate in his own words. "I was travelling with my wife," said he, "and we had a long ride before us to Grenada. I found that two diligences were to start the next day, one of them quite new, and the other an old one. I engaged the *coupé* of the new diligence, paid for it, and was told to be ready at six o'clock the next morning. When I went there, I found that an English woman and her servant had installed themselves in our place, which they preferred to the old carriage, in which they had chartered the *coupé*. I protested; but the woman cut me short with, 'I am the Duchess of ——, and shall retain this carriage.'

"'Ah,' I replied, bowing low, 'but I am the Prince Thomas of America, and my other titles are Boston, New York, Philadelphia, Chicago, and Salt Lake. We are all princes in America; and, madam, my wife is the Countess of Michigan, Illinois, and Kentucky.'

"But the woman repeated her title, and refused to move. She did not care for an American prince; and I was about to call the officials to eject her, when my wife said, in her hearing, 'If she is so unlady-like as to act in this way, we will leave her to herself, and ride in the old diligence.'

"The new vehicle moved off, bearing the English duchess, and we followed ten minutes later in the old one. About two miles from the starting-point, we passed the new carriage with a broken pole, and the driver and conductor were endeavoring to get another from a neighboring farm-house. As we passed them, I shouted to our postilion that I would give him a real for every mile he kept ahead of the other carriage,

and a dollar for every hour he arrived in advance of his usual time.

"He accepted the offer, and urged the horses to their best speed. Every time we changed, I distributed a few reals to the men about the stable; and I heard the postilion hint to them to make the changes as fast as possible, but to be in no hurry in supplying the other diligence. We went at a killing pace, and every time when we halted, the postilion said, 'You will owe me a great deal of money for this; you will owe me a great deal of money.'

"I found on calculation that I should owe him a very liberal gratuity, and assured him that I would pay everything I owed. As we passed through a certain wood, I observed that he watched the road-side very closely, and soon after repeated his remark about my indebtedness to him. I could not understand what he meant, but was wiser afterwards.

"We reached Grenada more than three hours ahead of time. There was then but one decent hotel in the place; and I knew that my duchess would be certain to go there, as it was not only the best hotel, but the point of arrival and departure of the diligence. The house was nearly full, and I engaged all the vacant rooms, paid a part of the money for them, and took a receipt. Two or three Spanish travellers arrived in the next hour, and I gave up some of my rooms to them, but enjoined the landlord under no circumstances to admit the duchess, or I would prosecute him for a violation of the contract.

"We dined, and took our ease in our room, and, after dinner was over, we watched for the other diligence, which was somewhat overdue.

"When it arrived, it was three hours behind the regular time, or six hours later than ourselves. The delay in consequence of the pole giving way had been more than an hour; but this was the least important mishap of the journey.

"The diligence had been robbed, and the brigands had done their work most thoroughly. They had an understanding with the drivers, whom they never disturbed, and ex-

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pected the diligence at the wood where my postilion looked around so anxiously. The rapid rate at which I was travelling in the old carriage took us past the haunts of the robbers an hour before we were expected, and thus I unwittingly saved myself from being plundered. It turned out that the frequent remark of the postilion, that I should owe him a great deal of money, referred to this little business of robbing more than to the fast driving. By following my desires in the matter of speed, he had saved me from an encounter with the brigands, who would have relieved me of all my spare cash, and of everything else of any value to them.

"As soon as I found how the matter stood, I sent for the fellow, who had been all the time loitering about the court-yard, and asked him how much he thought I owed him. He replied with the utmost dignity, though he could not suppress a smile, that he thought ten dollars, in addition to what I had given him, would be satisfactory. I paid with alacrity, and should have been equally satisfied had he asked five or ten times as much.

"The Duchess of —— had been robbed about as much as she could be. The brigands were, no doubt, indignant that our diligence had escaped them, and determined to make complete work of the one they captured. They took her trunks from the carriage, and rifled them of everything they contained. They compelled my lady to hand over all her money and jewelry, and even stripped her of her travelling-dress, leaving her to finish her journey in her under-clothing. They offered her no indignities, and were as polite as could be expected under the circumstances. Not relishing the idea of arriving at the hotel dressed as she was, she had cut away the plush lining of the carriage, and hung it around her waist as a sort of skirt of a decidedly gaudy pattern. She was the most woe-begone picture I ever looked upon, and my heart relented when I saw into what a plight she had fallen. I had fully determined not to allow her to stop at the hotel; but when she arrived in utter destitution, I told the landlord to tell her that all the rooms had been taken by the American

prince, who was only too py to accommodate an English duchess. She apologiz f r rudeness in the morning, though she could not rid lf of her haughty demeanor.

"My wife supplied her wi clothing enough to save her from inconvenience until she c d communicate with the English consul. That gentleman did all in his power to aid his countrywoman, and, although he ran the risk of losing the money, he cashed her draft upon her bankers in Madrid. We left town before she did; and I think she never after set up her privilege of rank to take possession of places that did not belong to her. I have always felt obliged to her for driving me into the old dili nce, rousing my indignation, and leading me to be] di f my money in securing the highest speed, and robbery."

LVIII.

MINERAL RESOURCES OF AUSTRALIA AND NEW ZEALAND.

COLONIAL EXHIBITS AT THE PHILADELPHIA CENTENNIAL—WONDERFUL MINERAL WEALTH OF THE ANTIPODES—CURIOUS FEATURES OF THE GOLD FIELDS—HOW A PARTY OF CALIFORNIANS WERE DECEIVED—DISCOVERIES OF GOLD AND HOW THEY WERE MADE—TROUBLES WITH THE MINERS—AN INSURRECTION AND ITS RESULT—FIELD OF THE AUSTRALIAN MINES—COAL, IRON, AND OTHER MINERALS—THE RESOURCES OF NEW ZEALAND—ITS GOLD YIELD—GEOLOGICAL PECULIARITIES—AGRICULTURAL AND OTHER WEALTH—VICISSITUDES OF MINING LIFE—PLANS FOR ENCOURAGING IMMIGRATION.

At the International Exhibition held at Philadelphia in 1876, the Australian colonies attracted much attention by reason of their exhibits. All the products of the continent were displayed, and there was an interesting array which embraced a wide variety. Vegetable products were those from grains and grasses up to sections of trees and specimens of limbs and bark; and a fine exhibit of minerals was displayed. In the center of the space occupied by each of the colonies, there was something of great interest to the gold hunter; it was a monumental record of the gold taken out from the time of the discovery of the precious metal in Australia, down to the year of the Exhibition. In one case, it was a tall obelisk covered with gold leaf; its cubic contents were equal to that of the gold taken out of the earth in the colony, that presented it. Another of the colonies had a similar monument, but gave it the shape of an oblong block, and a third put it in the form of a gilded pillar. One of the colonies had plaster casts of the most famous nuggets it had produced; they were gilded so as to present a wonderfully deceptive appearance, and as they lay in their cases, they attracted large crowds, including many persons, who supposed they were gazing upon the genuine lumps of the precious metal.

Down to the date of the discovery of gold, Australia was almost a *terra incognita*, and the chief knowledge which the outer world possessed of it was as a place of exile for English convicts. It was known to have excellent qualities as a grazing country, and attracted emigration among those who wished to follow farming and sheep and cattle raising. It had long been known to possess iron and other minerals, but none of them were supposed to be of great value. Indeed, a geological survey of Victoria and New South Wales, less than fifty years ago, was fruitless in its results, and the engineers who were engaged upon it reported that the country must rely for its wealth upon its agricultural facilities alone.

It would be useless to attempt a classification of the districts in which gold has been found, as new deposits are opened up every year, and no man can determine with precision the limit of the auriferous territory. The deposits are unlike those of most other countries, so much so, that old miners of California who go to Australia, find that their previously acquired knowledge is of comparatively little use. Quartz and pipe-clay are generally associated with gold in the Australian diggings; the quartz is found in all sizes and shapes, from minute pebbles worn and smooth by many centuries of attrition, up to huge masses weighing many tons, and cropping out from the surface in fantastic forms.

Gold is also found intermixed with sandstone, iron-stone, and white and blue clay. In fact, it is found in many conditions, unknown in California and elsewhere, and this state of things has given rise to some curious incidents.

During the first years of the golden age in Australia, many miners went thither from California. They looked at the ground with practical and critical eyes, and some of them declared that the whole story of rich deposits in places where they were said to exist, must be wholly false, as gold "could not" be found there, according to their knowledge of mining matters. A party of them went one day on a prospecting tour up a small valley, and returned in disgust. No gold was or could be there.

While they were at supper in their tent, three or four freshly arrived gold hunters came up and innocently inquired their way to a good place to dig. As a joke, the Californians told them that they had that day visited a valley which was very rich, and would make a handsome return to anybody who worked it.

Bright and early next morning, the strangers, who were novices in gold digging, were on their way to the new mines. They found nobody there, somewhat to their surprise, and hesitated for fear they were in the wrong place. One of the Californians followed them stealthily, and finally saw them begin work. Then he returned to his companions, and all had a good laugh over the "sell" upon the new comers.

The latter worked diligently, and in almost complete ignorance of mining rules. The first two days they found nothing, but on the third day, they struck a rich lead and were happy.

The Californians had forgotten the sell upon the strangers, when, a couple of weeks after the perpetration of the joke, one of the latter came around and asked why they were not at work in the place which they said was so rich. The Californians laughed, and one of them said:

"You hain't been working there all this time, have you?"

"Of course we have," was the reply.

"Well, now, give it up," said California, "the joke's gone far enough."

"Joke, what joke?" the stranger asked.

"Why, we sent you up there just for a joke, because you were greenhorns. There ain't no gold there, nor never was."

"Well, if that's so, the joke is on you," was the reply, and the miner told of the good luck of his party.

The Californians devoted a few minutes to unincumbered profanity, and then went and staked out claims near those of the strangers. Thus they indirectly made something out of their practical joke. Thus was discovered one of the richest fields in the Bathurst district.

Profitable diggings are scattered all over the country, but are chiefly in New South Wales and Victoria. The gold was

at first found in small lumps in the surface earth, but this was soon exhausted. Then deep excavations were made, and though the deposits were not so numerous, the lumps were found to be larger. At Ballarat, near Geelong, where the most valuable lumps were found, the shafts were sunk sometimes to a depth of more than a hundred feet. Masses of pure gold weighing many pounds were brought to light—one of them weighed no less than one hundred and thirty-six pounds, and was valued at more than thirty thousand dollars.

Previous to the gold discovery, copper ore of great richness was found in South Australia, not far from Adelaide. Other deposits of copper have been found, and there are many fine veins of tin, lead, and silver. In fact, the mineral wealth of Australia is by no means fully known, and the opportunities for making fortunes are very far from exhaustion.

Coal exists in many localities, especially on the eastern coast, where it is found associated with beds of sandstone. The seams are large and of great extent; the coal is of good quality and easily mined; it has proved to be a source of great wealth to those engaged in putting it upon the market. By facilitating steam communication, it has done much toward the development of the colonies, especially that of Victoria.

The history of the gold discovery in Australia is no less romantic than the account of the finding of the treasure deposits in California.

The first discoverer of gold in Australia is believed to have been the Rev. W. B. Clarke, of Sydney, who, in 1841, found gold in the mountainous regions to the west of the Vale of Clwyd, in New South Wales; in 1844, he exhibited a specimen of gold in quartz to the then Governor, Sir George Gipps, and others. But the subject was not followed up, "as much from considerations of the penal character of the colony, as from general ignorance of the value of such an indication." Mr. E. H. Hargreaves returned to Sydney from California in 1850, for the express purpose, as he states, of searching for gold; and on the 12th of February, 1851, he succeeded in finding gold at Summer Hill Creek, in New South Wales. This

liscovery afterwards led to gold being found in other places in :hat colony, and to the discovery of fhe gold-fields of Victoria.

Previous to this time, however, the colony of Victoria was a dependency of New South Wales, and a strong feeling had gained ground that it suffered in consequence. Complaints were made that the expenditure of Government moneys in the district was not equal to the amount of revenue yielded by the taxes levied and lands sold within its borders. The distance from the capital was also found to operate injuriously to the interests of the colonists, and a cry was raised for separation. The demand was, as a matter of course, resisted by New South Wales, but as the agitation was carried on with increased activity, it was at last yielded to by the Home authorities. The vessel bearing the intelligence arrived on the 11th of November 1850. The news soon spread, and great was the satisfaction of the colonists. Rejoicings were kept up in Melbourne for five consecutive days, on three of which not even a newspaper was published, and on the night of one the city was illuminated. Before, however, the separation could be legally accomplished, it was necessary that an act should be passed in New South Wales, to settle details in connection with the establishment of a Legislature in the new colony, and that sundry other observances should be gone through. The requisite forms were at length given effect to: on the 1st of July 1851, a day which has ever since been scrupulously observed as a public holiday, it was publicly announced that the Port Philip district of New South Wales had been made a separate colony, to be called Victoria, after the name of the Queen of England.

In little more than a month after the establishment of Victoria as an independent colony, it became generally known that rich deposits of gold existed within its borders. Two years and a half previously a lump of gold had been exhibited in the shop of a jeweler at Melbourne, named Brentani, which it was said had been found in the locality of the Pyrenees Ranges by a shepherd named Chapman. This created some little excitement at the time, but as the man could never point out the place where he had found the specimen, and indeed

soon deserted a small searching party he had undertaken to guide to the spot, it was readily supposed he was an impostor, and had obtained the gold by melting some articles of jewelry he had stolen, and so the belief in the existence of a gold-field gradually grew weaker. The discovery of gold, however, in New South Wales, by Hargreaves, in February 1851, caused numbers to emigrate to that colony. This being considered detrimental to the interests of Victoria, a public meeting was held in Melbourne on the 9th of June, at which a "gold-discovery committee" was appointed, which was authorized to offer rewards to any that should discover gold in remunerative quantities within the colony.

The following is a short statement of the order in which the Select Committee appointed by the Legislative Council to consider claims for rewards for gold discoveries in Victoria, placed the various claimants in their report dated 10th of March 1854:

The Hon. W. Campbell discovered gold in March 1850, at Clunes; concealed the fact at the time from the apprehension that its announcement might prove injurious to the squatter on whose run the discovery was made, but mentioned it in a letter to a friend on the 10th of June, and afterwards on the 5th of July 1851, which friend, at Mr. Campbell's request, reported the matter to the gold-discovery committee on the 8th of July. Mr. L. J. Michel, and six others, discovered gold in the Yarra Ranges, at Anderson's Creek, which they communicated to the gold-discovery committee on the 5th of July. Mr. James Esmond, a California digger, and three others, obtained gold in the quartz rocks of the Pyrenees, and made the discovery public on the 5th of July. Dr. George Bruhn, a German physician, found indications of gold in quartz "two miles from Parker's station," in April 1851, and forwarded specimens to the gold committee on the 30th of June. Mr. Thomas Hiscock found gold at Buninyong on the 8th of August, and communicated the fact to the editor of the *Geelong Advertiser* on the 10th of the same month. This discovery led to that of the Ballarat gold-fields. Mr. C. T. Peters, a hut-keeper at Barker's Creek, and three others, found gold at Specimen Gully on the

20th of July; worked secretly to the 1st of September, then published the account. This led to the discovery of the numerous gold-fields about Mount Alexander, and afterwards to those of Bendigo.

The deposits were found to be richer and to extend over a wider area than any which had been discovered in New South Wales. Their fame soon spread to the adjacent colonies, and thousands hastened to the spot, desirous of participating in the newly found treasures. When the news reached home, crowds of emigrants from the United Kingdom hurried to these shores. Inhabitants of other European countries quickly joined in the rush. Americans from the Atlantic States were not long in following. Stalwart Californians left their own gold-yielding rocks and placers, to try their fortunes at the southern Eldorado. Last of all, swarms of Chinese arrived, eager to unite in the general scramble for wealth.

The payment for a license to dig for gold was first fixed at £1 10s. per month, and this was afterwards reduced to £1 10s. per quarter. The license fee was not seriously objected to in the early days of the gold-fields, when gold was found in large quantities by almost all who sought it, but in the course of a year or two, the number of gold diggers had increased so enormously that many were unsuccessful, and the license fee even in its reduced state became a heavy burden. The mode of collecting the tax by means of armed troopers, who surrounded parties of miners at work, and arrested all without licenses, was very obnoxious, and led to resistance.

Towards the end of the first year of the gold discovery, the Government determined to raise the license fee to £3 per month, and actually issued a proclamation, dated 1st December 1851, stating that on and after the 1st of January 1852 such amount would be charged. This was met by strong protests on the part of the diggers, which resulted in the proclamation being rescinded on the 13th of December 1851. No licenses therefore were ever issued at the increased rate.

Public meetings were held on some of the gold-fields to protest against this state of things, but as little notice was

taken of them by the government, the discontent continued. It finally culminated in an outbreak at Ballarat, near the end of 1854, when the diggers erected a stockade known as the Eureka, and defied the authorities. All the troops that could be mustered were sent to Ballarat and on the 2d of December, the stockade was taken by storm. The riot was quelled with some bloodshed on both sides, and a government commission was appointed to investigate the matter. None of the prisoners were ever convicted, and the result of the affair was that the oppressive tax upon the miners was removed.

The effect of the gold discovery upon the population of Australia may be seen by a few figures from the returns of the last census in 1871. On the 2d of April of that year, the number of inhabitants in Victoria was 731,528. Ten years previously it was 540,322. The increase during this interval was therefore 191,206, or 35.39 per cent. In 1851, which was the year of the discovery of gold, the population amounted to 77,345. The increase in the twenty years between that period and 1871 was therefore 654,183, or at the rate of 846 per cent.

Like all gold mining countries, Australia has attracted a great many adventurers in search of wealth. Nearly every country on the earth was represented in the emigration, and many of the representatives were not calculated to reflect credit upon the lands of their birth. Probably the accumulation of all kinds of races and nationalities in California was fully equaled by that in Australia, and particularly at Melbourne. At one time murders were so common in that city that a correspondent writing from thence, said it was the "bourne whence no traveler returns."

It is a remarkable fact that, both in 1873 and 1874, more persons born in the United States, in proportion to their numbers in the population, were arrested in the colony of Victoria, than those of any other nationality. The chief causes of arrest were, as in the case of citizens of most other countries, drunkenness and disorderly conduct; still, there were a not inconsiderable number of arrests for more serious offenses, and the proportion committed for trial was much greater than that of

persons born in any other country. The number of Americans settled in Victoria is but small, and it is not impossible that it is to a certain extent made up of those who, in consequence of their misdeeds, found it desirable to absent themselves from the country of their birth, and that they conduct themselves no better there than they did at home. In the year under review, next to Americans, the Irish, in proportion to their numbers, contributed the largest number to the arrested; and next to them, the French. In 1873, more of the last-mentioned fell into the hands of the police than those of any other country, except the United States. In 1874, Frenchmen were next to Americans in the numbers committed for trial. The remark applied to the latter, with reference to the probable reason for their leaving their own country, will perhaps also be applicable to them. Although the proportion of Irish committed for trial was greater than that of either English, Welsh, Scotch, or Victorians, it was less than that of persons of any of the other nationalities.

The whole quantity of gold taken out in Victoria alone, from the discovery down to the year previous to the exhibition at Philadelphia, was nearly forty-four and a half million ounces, representing a value of not far from nine hundred millions of dollars. Truly, Australia has been of no ordinary importance as a land of gold. Probably her total mineral wealth of every kind thus far taken from the earth and turned to practical use, would not fall short of two thousand millions of dollars!

As in California and elsewhere, the early form of working and surface diggings has given place to quartz mining. Of the yield, set forth in the most recent statistics, it is estimated that sixty per cent. of the gold came from quartz reefs, and forty per cent. from alluvial workings. In the previous year, it was estimated that fifty-seven per cent. was obtained from quartz reefs, and forty-three per cent. from alluvial workings.

According to estimates made by the mining surveyors and registrars, the number of quartz reefs proved to be auriferous is 3,398. The Secretary for Mines points out that these cannot in every case be distinct reefs, as parts of the same reef,

in some localities, are held to be distinct ones, and named accordingly; and, moreover, as the reefs are further explored, it is frequently found that what were supposed to be separate reefs are in reality not distinct.

From information obtained by the same officers respecting the amount of gold obtained from a considerable proportion of the quartz crushed, the average yield per ton is estimated to have been 11 dwts. 10.55 grs. in 1873, and 11 dwts. 20.51 grs. in 1874.

Gold-mining in Australia, instead of being, as formerly, practiced by the individual miner, is now almost entirely in the hands of companies. In a single year, the dividends paid by these companies exceeded ten millions of dollars.

Following are some of the most famous Australian nuggets whose fac-similes were exhibited at Philadelphia:

The "Beauty" Nugget weighed 242 ozs. It was discovered at a depth of nine feet from the surface, in Kangaroo Gully, Bendigo, in the year 1858. The gold was 22.2$\frac{7}{8}$ carats fine.

The "Platypus" nugget weighed 377 ozs. 6 dwts. It was found in Robinson Crusoe Gully, Bendigo, in a pillar of earth of a deserted claim. The claim was situated in shallow alluvium, and the nugget was discovered in March, 1861. The gold was 22.1$\frac{1}{8}$ carats fine.

The "Viscount Canterbury" nugget was found in John's Paddock, Berlin Diggings, at a depth of fifteen feet from the surface, on the 31st of May, 1870. It weighed 1,105 ozs. The gold was 23.3 carats fine.

The "Schlemn" nugget was found at Dunolly on the 11th of July, 1872, at a depth of three feet beneath the surface. It weighed 538 ozs., and is estimated to contain 60 ozs. of quartz.

Nugget [not named] found in Broomfield's Gully, Creswick, on the 8th of August, 1872. It weighed 24 ozs. 3 dwts., and was got at a depth of one hundred feet below the surface.

The "Kum Tow" nugget weighed 718 ozs. 5 dwts. It was found on the 17th of April, 1871, in Catto's Paddock, Berlin Diggings, at a depth of twelve feet six inches below the surface. It was found by a party of Chinamen. The gold was 23.3 carats fine.

The "Viscountess Canterbury" nugget was found on the 3d of October, 1870, at Berlin. It was discovered at six feet six inches

beneath the surface, and weighed 884 ozs. 10 dwts. The gold was 23.2⅝ carats fine.

Many other nuggets were shown. The last on the list was the "Welcome," found on the 11th of June 1858, at one hundred and eighty feet below the surface, at Bakery Hill, Ballarat. It weighed 2,195 ounces!

It was long doubted, by able geologists, whether there were any rock formations in Australia that would yield diamonds; and even after discoveries of them had been made, doubts continued to be expressed about the truthfulness of the reports. For several years past the original discoveries have received confirmation by the undoubted subsequent unearthing of this interesting gem. They occur along with tin-sand and titaniferous ore, close by, if not actually in, decomposed granite: that is to say in rubbish, of which felspar, mica, quartz, and iron form no inconsiderable proportion.

Lying below the present granitic rocks, and stretching for several miles, sometimes near the surface, and seldom two hundred feet below it, is a gravelly formation, consisting of the materials usually found in what, in Brazil, is called "Cascalho" and "Itacolumite" of the coarser kind. This may be observed quite commonly on the spoil heaps of the gold diggers. No diamonds have hitherto, however, been found in precisely this formation; but their allies, the pale blue topaz, many shades of corundum, both crystallized and amorphous, angular and water-worn, yellow and white pebbles of crystalline quartz, frequently of large size, zircons, &c., are quite common.

The largest diamond yet found did not exceed four carats in weight, but was a fine stone.

Blue and green sapphires, spinels, topazes, and other gems are found occasionally, and there is a general belief among geologists that rich deposits of them may yet be discovered. Some authorities estimate the diamond-producing area of New South Wales at five hundred square miles. By the same estimate the coal fields are placed at 21,000 square miles, iron at 1,400, gold at 13,000, tin at 6,000, and copper at 3,000. Mineral lands are now leased at five shillings annual rental per acre.

From an American point of view, Australia and New Zealand are associated, although they are distinct colonies, and are a long distance apart. New Zealand, discovered and named in 1642, by a Dutch navigator, TASMAN, who also discovered and named Tasmania in the same year, consists of two large and one very small island, lying 1,200 miles southeastward of Australia, between 34° and 48° south latitude, being about antipodal to Great Britain. Its length of coast line is 3,000 miles, its shape being long and narrow; its area is about that of the State of Oregon. It is of volcanic origin, ribbed with mountains, and is better watered than Australia in respect to both lakes and rivers. Its temperature is lower than that of corresponding latitudes in Europe, and higher than that of corresponding latitudes in America, but the climate is more salubrious than in Great Britain, although very changeful in temperature and moisture.

In minerals, it is nearly as rich as any of the colonies, the gold yield having been $9,937,125 in 1873, and the total exported to July 1, 1875, $151,407,045. Copper, silver, tin, iron, and coal have also been found. Nearly everything grown in Great Britain flourishes there, together with the fern in tree form thirty feet high, a wild flax, nearly equal to manila for rope-making, an excellent variety of valuable building and ship-building woods, and an abundance of the fruits of both semi-tropical and temperate countries. The population has risen thus from 26,707 by the original census of 1851: 1858, 59,413; 1861, 99,022; 1864, 172,518; 1867, 218,668; 1871, 256,260; 1874, 299,514; and of 1875, 375,876; all these figures exclusive of aborigines and Chinese, it thus appearing to be equaled only by Victoria and New South Wales, of the Australian colonies.

In respect to emigration, it compares favorably with Victoria, its excess of immigrants over emigrants having been 38,106 and 25,270 in 1874 and 1875 respectively, against 3,367 and 2,698 for Victoria in those years. It has 550 miles of railroad, and 7,065 of telegraph wire; Victoria has 586 and 4,981 miles respectively; New South Wales, 437 and 8,014. Its number of sheep was 11,704,853 in 1874, having multiplied

about two and a half times in ten years. The land under cultivation two years ago was 1,788,797 acres—an increase of 285,445 during the previous twelve months. Small as this total is—less than three per cent. of the whole—the proportion of cultivated land in New South Wales was less than one and one-half per cent., and in all Australia less than one-fourth per cent. at the same time. Taking as the assumed habitable portion the strip 250 miles wide along three sides of the Australian coast, 758,000 square miles in extent, that piece, nearly equaling in size the twenty-six States of this Union lying east of the Mississippi, would contain, if the island population were distributed over it, about three persons to the square mile, against three and one-half in New Zealand, eighty-three in New York, one hundred and fifty-eight in Massachusetts, three hundred and seventy-two in England, and four hundred and ten in Belgium. But the reader should remember that as these colonies are all pastoral, the area tilled is a very different matter from the area occupied. The principal endowment of Australia at present, besides mineral resources, being the vast areas of rich native grasses and the peculiar fitness of soil and climate which "make bad fleeces good and good better," the colonist has become a herdsman.

It does not appear that New Zealand is behind her larger neighbors, a thousand miles distant, in any material respect. The colonies all invite immigration, and some of them have latterly taken energetic measures to secure it. They offer bounties to settlers, reduced passage rates, and other inducements, and have been quite successful both in England and America.

The mineral resources of New Zealand are quite as varied as those of Australia. The rocks contain copper, iron, silver, gold, tin, and other metals, and there are extensive beds of coal of excellent quality. The processes employed in working the mines are almost identically the same as in Australia, so that an extended description is unnecessary. The great majority of the miners in New Zealand came originally from Australia, and their proportion of good and bad luck has been much like that in the latter country.

LIV.

UNDERGROUND IN SAN FRANCISCO.

CHINESE OPIUM DENS. — PISCO. — EXPERIMENTS IN LIQUORS. — SATURDAY NIGHT AMONG THE CHINESE. — COCOMONGO. — MURDERER'S ALLEY. — CHINESE MUSIC. — THE THEATRE. — BETEL AND ITS USE. — THE BARBARY COAST. — CHEAP LODGING-HOUSES. — A DYING VICTIM. — A DEN OF THIEVES. — "THE SHRIMP." — UNDER THE STREET. — A REPULSIVE SPECTACLE. — OPIUM SMOKING. — ITS EFFECTS. — SAMSHOO. — ITS PREPARATION AND QUALITIES. — INTRODUCTION TO AN OPIUM DEN. — THE OCCUPANTS. — EXPERIMENT ON A SMOKER. — HOW TO SMOKE. — TRYING THE DRUG. — MESCAL. — GOING HOME. — TRYING A SEWER. — A COUNTRYMAN'S DRINK.

UNDERGROUND life, of a peculiar and picturesque character, can be seen in San Francisco, in the parts of the city where the Chinese most do congregate. Soon after my arrival there, two of my friends, whom I will call the Doctor and the Colonel, invited me to a nocturnal visit to the Celestials. I accepted with alacrity, and, dressed in my poorest and oldest clothes, met my friends at the appointed hour in the *Alta* office. Macrellish and Woodward gave us their benediction, and we set out on our journey.

"The best thing we can do," said the doctor, "is to lay in a stock of some powerful disinfectant, or neutralizer, before we start; the stench in some of those underground China kennels is something frightful." I suggested carbolic acid. "Not strong enough!" said the doctor, shaking his head, doubtfully. The colonel forced two long streams of smoke from his cigarito through his nostrils, stroked his long mustache thoughtfully, and suggested, —

"Pisco?"

"What is Pisco?" I demanded.

"That settles it, my friend; you have a new experience before you, and we will fall back on Pisco!" said the colonel.

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DRINKING "PISCO" (PERUVIAN BRANDY) IN A SAN FRANCISCO SALOON.

"You will be in luck if you don't fall back on the sidewalk after you have drank it!" growled the doctor.

The colonel took my arm, and as we went down towards Montgomery Street, proceeded, in a confidential manner, to enlighten me on the subject of Pisco. It is really pure, unadulterated brandy, distilled in Peru, from the grape known as Italia, or La Rosa del Peru, and takes its name from the port of Pisco in which it is shipped. It is perfectly colorless, quite fragrant, very seductive, terribly strong, and has a flavor somewhat resembling that of Scotch whiskey, but much more delicate, with a marked fruity taste. It comes in earthen jars, broad at the top, and tapering down to a point, holding about five gallons each. We had some hot, with a bit of lemon and a dash of nutmeg in it, at a marble-paved and splendidly-decorated saloon, near the corner of California and Montgomery Streets. The first glass satisfied me that San Francisco was, and is, a nice place to visit, and that the doctor and the colonel were good fellows to travel with. The second glass was sufficient, and I felt that I could face small-pox, all the fevers known to the faculty, and the Asiatic Cholera, combined, if need be.

The colonel rolled me a cigarito, and insisted on my smoking it. I did my best, choked myself with the fine tobacco, let the paper wrapper unroll, burned my fingers, and failed ignominiously. I was glad to see that, while he pitied me, he did not wholly despise me. These Californians have an appreciably large share of liberality in their composition, and will pardon your ignorance on almost any given specialty of their state, provided you don't claim that you have something very nearly as good "at the East." That assumption they cannot, and will not, tolerate on the part of anybody, and I don't so much blame them, after all.

It was Saturday evening, and the streets were crowded, Montgomery and Kearney Streets swarming, as you may say, with people, well dressed, sociable, orderly, and satisfied with themselves and the rest of mankind. Suddenly the colonel remembered that the wine called Cocomongo, from the vine-

yard of that name, near San Bernardino, Southern California, was one of the specialties of a saloon which we were passing at the moment, and we went in and had some.

It was a warm, fruity wine, of a dark-amber hue, very strong, and withal palatable, which I did not find to be the case with *all* the California wines that I tasted. We went up Washington Street to Murderer's Alley, and turned down it, towards Jackson Street. "There is where the French woman was murdered in the night, within ten feet of where hundreds of people were coming and going all the time; and her murderer, after robbing the place, coolly washed his hands and face of the blood, and walked away. He was never discovered. Here, right where we stand, is where the Chinaman cut his runaway mistress open with a sword. I saw him hanged for it. And there is where the police shot—" I thanked my kind friend for this cheerful information, but suggested that it might be well to keep a little of it back for another time. It was not well to exhaust all the pleasant things of life at one sitting. The subject was obligingly changed.

I am satisfied that the name of the alley is well deserved and appropriate. Swarms of Chinese women, with almond eyes, baby faces, painted red and white in the most lavish manner, lips touched with vermilion, hair black and glossy, with a purplish tinge, like the wing of a raven, and clad in blue satin coats and pants, trotted along the alley, their curious wooden-soled, silk and bullion-embroidered shoes rattling like the hoofs of a flock of sheep as they went. Others tapped upon the window panes, to attract our attention as we passed. Before one house we saw "joss-sticks" burning, and the white cloth festooned over the door, and hanging down on either side, told that death was there. We heard the beating of gongs, the squeaking of one-stringed Chinese fiddles, the sharp notes of the kettle-drum and other discordant instruments, making music inside, and, as we passed, a woman, clad in blue and white, threw a bunch of lighted fire-crackers upon the doorstep, where they went off like a running fire of musketry, much to the edification of a gang of little pig-tailed, almond

eyed boys, — "demi-Johns," I think the doctor called them, — who were gathered around, chattering like so many magpies all the time, in their, to me, uncouth jargon. The Chinese is an ancient language, beyond a doubt; and I don't see why it has not worn smoother by use in the hundred centuries or more since the "Central Flowery Empire" became "known and feared among the nations."

On Jackson Street we stopped a few moments in front of the Chinese Theatre, listening to the unearthly din of gongs, which from time to time announced the change of scene, in a never-ending historical drama, and looking about for a special policeman to take us into an opium den. While we stood there, the colonel called our attention to one of the specialties of the fruit stall, at the entrance of the theatre. Among the dozen nameless prepared delicacies calculated to tickle the Celestial palate, and catch the Mongolian eye, was a row of little conical packages, of about one ounce weight each. These were composed of an outer wrapper of some kind of a queer leaf — I could not make out its exact character, but it was apparently that of a tree not native to America — enclosing two or three narrow slices of fresh cocoa-nut, a few thin slices of some fruit or nut resembling in appearance a fresh nutmeg, and about a teaspoonful of a pink-colored paste. A small bowl, filled with this pink paste, stood beside the packages, ready for use, and some of the nuts ready sliced, but not done up in packages, lay near it. The doctor explained that these packages were chewed by the Chinamen as some Caucasians chew tobacco. The chewing produces a lavish flow of saliva, and the chewer has the appearance of having his mouth full of blood, as if from bronchial hemorrhage.

The small nut was the famous "*betel*" (pronounced be-*tel*), and the principal ingredient of the paste was quick-lime. The betel is now raised in California. The colonel said he had always made it a rule to drink the peculiar drinks, and eat the peculiar delicacies, of every country he visited, and he had tried chewing the betel. It only made his gums sore, loosened

his teeth a little, and gave him the heartburn. He could conscientiously recommend it as an experiment eminently worthy to be made by anybody in the interest of science, and thought I should try it by all means. I asked him if he had ever attacked a ready-made sausage in a cheap restaurant. He was forced to admit that his faith in human nature, broad and liberal as it is, had never made him equal to the attempt. I told him that in that case he was only a dabbler in the wide field of science, and until he had entered deeper, he was unfit to give advice to others on the subject.

I declined the prepared betel, lime, cocoa-nut and leaf, but took a bit of the sliced betel plain, and chewed it. It had a slightly astringent effect on the mouth, and though without any very strongly perceptible flavor, soon produced a slight choking sensation in the throat, and a rather strongly marked palpitation of the heart. I don't think I like betel. It is evidently an "acquired taste," as the Englishman remarked about wild turkey, when a party of western practical jokers played off buzzard on him for the noblest bird of the American forest.

They said that the officers had all gone over upon the "Barbary Coast" — another of San Francisco specialties — as there had been a shooting scrape over there. We went on through Dupont Street, to that part of Pacific Street known as the Barbary Coast. The locality is the favorite resort of the dregs of the population of the Golden City — thieves, robbers, prostitutes, and loafers of the very lowest class, and of every color and nationality represented on the earth, Africa, Asia, all Spanish America, the West Indies, the islands of the Pacific, all Europe and North America, having each contributed its quota to make up the mass of vice, crime, and utter rottenness which surges up and down that horrible "coast." It well deserves its name.

We met the officers coming back with their prisoner, a drunken loafer from Australia, who was making night hideous with his yells as they hustled him along towards the calaboose, followed by a motley crowd, whose aimless curiosity led them to rush along pell-mell in their wake.

One of the specials, whom my companion familiarly addressed as "Shrimp," — probably on account of his elephantine proportions, — consented to come back and pilot us to our destination as soon as the party reached the calaboose. Meantime we went into a Spanish cigar shop, bearing the high-sounding and poetical name "*La Flor de la Mariposa*," literally "The Flower of the Butterfly," and bought some villanous cigars, the colonel and the proprietor becoming involved in an animated dispute in Spanish over the revolt against the Juarez government in Mexico.

Out on the street once more, the colonel wanted us to go through the dens on the "coast." He would take us to the "Bull Run," the "Cock of the Walk," the "Roaring Gimlet," "Hell's Kitchen," and a few similar resorts, and convince me that we had nothing like them in New York. Rather than make the visit, I conceded all he claimed as to the superior and in fact unapproachable depravity of this part of San Francisco; and we retraced our steps to Jackson Street, where, in the heart of the Chinese quarter of the town, we found our officer, and set about the work of investigation, for which we had started out in the early part of the evening.

"Better go down and see how some of these people live, before you go to see how they die," said the officer, leading the way into a dark passage running from the streets into the centre of the block. We stumbled along the passage for some fifty feet or more, and came to a rickety, dirty stairway, which we descended, feeling our way along step by step, until we stood in a court-yard surrounded with high brick buildings on all sides. We could see nothing round us for the moment; but the stench was almost overpowering, and the chattering, which was going on in all directions, convinced us that we were in a locality literally swarming with the lowest class of the Mongolian population. The officer struck a match against the wall, and with it lighted a piece of candle, which he drew from his pocket. Immediately curious faces peeped out at us from behind old gunny-sacks, which took the place of windows and doors in the low basement walls, and a dozen

or two dirty, dilapidated, demoralized looking Celestials came out from different corners, and stood with their hands in their pockets, regarding us with evident suspicion as unauthorized intruders.

"This is a regular den of thieves. Not a single one of these fellows works at any honest trade for a living. They are the bummers and outcasts of Chinadom," said the officer. "Here, Sam Yap, you dirty rascal, have you robbed anybody's hen-roost yet to-night? — I suppose not, though; they don't generally get out at that kind of business until along just before morning, when the streets are almost deserted, and they can move about without much danger of being overhauled and searched. All these fellows are on it, but this one is the worst in the deck. I have had him up at least twenty times, and the next time I am going to vag him. Yes, I am, you bloody old chicken murderer!" said he, holding the candle up to his face that we might all get a good look at him. It must be admitted that it was not a prepossessing face.

He then went to one of the openings in the wall, and pulling back the screen of old bagging, showed us a party of ten or a dozen such fellows gathered around a low table of rough boards, playing dominoes for "copper cash," as the brass coin of China, the value of which is one tenth of a cent of our money, is commonly designated. They stopped a moment, and looked up suspiciously at us, and then at a sign from the officer, whom they appeared to recognize, went on with the game. They played it rapidly, with all sorts of exclamations and facial contortions for accompaniments. The dominoes are the same as ours, but they play the game quite differently. I don't know exactly how it is done, but they seemed to win and lose rapidly. In the centre of the court there was a small brick building, which seemed to be the receptacle of all the filth from the neighborhood. It did not seem to have any connection with the street sewer, or if it had any, it was choked up, for the planking around was literally floating in the foul liquid from it, which oozed up between the cracks at every step as we walked over it, giving off a stench, which,

in any other city of Christendom would breed a pestilence in twenty-four hours.

Behind this, near the opposite wall, we stumbled upon a bundle of filthy rags, which turned partially over as the foot of our guide came in contact with it. The officer held down his candle, and on examination we found that within the rags there was a human being, a man in the last stage of consumption, induced, no doubt, by opium smoking. He could not or would not answer our questions, and his glazed vacant eyes showed that death was close at hand to claim him. He was lying on the wet, dirty boards, without even a blanket under him, and had undoubtedly been placed there to die, having no friends, and belonging to neither of the "Six Companies" with which all prosperous or even partially respectable Chinese in California are connected. The officer turned his head over, and called our attention to the fact that his queue had been cut off, which showed that he had been convicted of theft at some time, and was thenceforward debarred from respectable Chinese society, doomed to associate only with the pariahs of his race.

We had seen enough, more than enough, in fact, of this neighborhood, and our guide led us out to the street by the way we came.

The Shrimp said that there was another place just above, on the same street, which he wanted us to visit before we went into a first-class opium house. We went with him to a large four-story building, which appeared to be divided into apartments of the smallest dimensions, in which the Chinese swarmed like bees in a hive. He said that there were over a hundred persons, all of the poorer class, sleeping in this single building every night. In front of the building was a hole or opening in the sidewalk, with a stairway just sufficiently wide to allow one person at a time to descend into the subterranean regions below. Down this he dived like a rat into his hole, calling out to us to follow and look sharp for our heads. The caution was not unnecessary, as I soon found to my cost. At the bottom of the stairs he lighted his candle

again, and passing through a low opening in the wall, showed us the way under the street.

Here, congregated in total darkness, were some twenty of the poorest class of Chinese stowed away for the night. Some were lying on piles of old rags, evidently picked up by the chiffonniers in their daily rounds, and put aside for this purpose, as having no commercial value, and of no use otherwise. Some were lying on rude benches knocked together from pieces of dry goods boxes, and one, who evidently held a higher position than his fellows, probably a man who had at some time drawn a twenty dollar prize in a lottery, or had a run of luck at the game of "Tan," was stowed away in a bunk in a kind of alcove formed by an arch in the wall, before which was hanging an old tattered chintz curtain. He had an old blanket over him, and was doubtless looked upon with envy and hatred as a "bloated aristocrat" by his less fortunate fellow-citizens. We could hear the ceaseless tramp of the crowd on the sidewalk, and from time to time the rattling of the carriage wheels over the rough cobbles above our heads.

The atmosphere was that of a charnel-house, thick with noisome exhalations from the foul and rotting rags, and the fouler persons, of the denizens of this worse than Black Hole of Calcutta. Water dripped from the roof constantly, and the walls were covered with mould and great patches of thick, oozy slime. What a place for a human being to sleep in and die in! In the five minutes we were there our clothes became clammy from the foul moisture. What must be the condition, physical and mental, of that poor wretch stretched in the rags in yonder muddy corner?

"And the wheels go over my head,
And my bones are shaken with pain,
For into a shallow grave they are thrust,
Only a yard beneath the street;
And the hoofs of the horses beat, beat,
Beat into my scalp and my brain,
With never an end to the stream of passing feet.

. . . . .

"O, me! why have they not buried me deep enough?
Is it kind to have made me a grave so rough,

Me, that was never a quiet sleeper?
May be still I am but half dead;
Then I cannot be wholly dumb;
I will cry to the steps above my head,
And somebody, surely, some kind heart, will come,
To bury me, bury me,
Deeper, ever so little deeper."

I wonder if there was ever a Tennyson of Celestial literature, and if he ever read anything like the above, and recalled it to mind, as he lay cowering and grovelling through the long hours of the dreary night, in the depths of this living tomb!

Out on the street once more, and we lost our guide, who was called off by a loud whistling for aid, from some other officer over on the Barbary Coast. My companions fell in with a Chinese merchant with whom they were acquainted, and we went with him to his store on Dupont Street. He gave us some scalding hot black tea in little China cups, and offered to help us in any way he could. O, yes, of course he was acquainted with the location of many "opium houses;" the Chinese quarter is full of them! Opium smoking is the great curse of China, and four fifths of the Chinese in San Francisco indulge in it to a greater or less extent. Some use it merely as a sedative, and in moderate quantities. Others use it as commonly as American tobacco chewers use the nicotian weed, consuming a dollar and a quarter's worth every day, and being more or less under the influence of it all the time. The poorer class of opium smokers patronize the opium lodging-houses, where they frequently sleep all night, paying fifteen cents for a few grains of prepared opium and a raised couch to lie on, while inhaling the smoke and sleeping off its effects.

Perhaps a quarter of the whole number of opium smokers use it to the extent of producing stupefaction habitually: these are all old smokers. The habit grows upon one steadily, and it soon beomes a terrible tyrant. When once the habit has become fixed upon a man, there is no possibility of its being thrown off. He daily requires more and more of the drug, while his strength slowly fails him: his appetite for ordinary food disappears; he becomes lean and attenuated;

his brain becomes so affected, that it refuses to act unless the stimulant is furnished, and sooner or later consumption sets in, and the victim dies by inches, as it were, sometimes suffering horribly, while at others he is hardly conscious of suffering at all.

The importation of opium into the Pacific states amounts to millions annually, and the great bulk of it is consumed in smoking by the Chinamen. The women never smoke it; are not allowed to visit the opium houses, in fact. The wealthier Chinamen have accommodations for opium smoking in the upper or back rooms of the buildings which they occupy as stores and dwellings, and do not associate with the common herd who patronize the public opium dens. One Chinese friend thought it a very bad thing, this opium smoking, but admitted that he occasionally took a whiff at it himself, when he felt unsettled, and wanted to quiet his nerves for a night's sleep.

While we were talking, the colonel suggested that I was a stranger, and had never tasted "Samshoo." Our merchant friend at once took down a curious looking black bottle,— something like those that Curacoa comes in, wound with some kind of straw string from top to bottom, and having a label in white and vermilion, with Chinese characters, — drew the cork, and poured out a quantity of a dark-brown liquor, something like arrack in appearance, into a little china bowl, which he passed to me, assuring me that it was a very superior article, and pressing me to drink it.

I tasted it, and found it not very strong, but with a curious flavor, something between old Madéira wine and bottled ale, with a marked unpleasant smell, as of decaying vegetable matter. What is it made from? "Licey!" was his prompt response. The doctor explained that it was distilled from rice — mainly the cold rice and refuse from the restaurants, he said — flavored and colored with dried peas, or some similar fruit, and strengthened and enriched with a fine old nutty taste by the addition of a piece of fat roasted pork before bottling. The Chinese consider this a great luxury, and have their private stocks of it, which they regard with as

much pride as is felt by a fine old English gentleman for his cellar of "old crusted port; vintage of 1803." A little of it satisfied me. I think the taste for it must be an acquired one.

Some months afterwards I drank some samshoo, in Northern China, that was far worse than that furnished to me in San Francisco. It was served hot, in small glasses about as large as a thimble. It burned like nitric acid; and I half believed that I had swallowed a torch-light procession with all its lamps trimmed and blazing. I was dining with a Chinese official, and the etiquette of the occasion required me to swallow the vile stuff. By the time I had disposed of a gill or so, my head felt like the paddle-box of a steamer, and my throat was as raw as a freshly cut beefsteak. No more samshoo for me, if you please.

Our new-found friend gave us a card, on which he wrote some characters in Chinese by way of an introduction, and pointed out the entrance to an opium house on the other side of the street. We went over and found the establishment located on the second story adjoining a Chinese restaurant. The proprietor of the house, or "gentlemanly clerk," looked at our card, and at once offered us the hospitalities of the place.

It was, of course, a very poor place, but he would do the best he could for us. There were half a dozen small rooms on the one floor, divided by rough partitions. We entered one of them, and found three raised platforms or beds, with bamboo framework; and in place of our usual mattress, a flat surface of braided cane, like one of our cane-seated chairs, on which to sleep. This is the usual bed of the Chinaman. He does not fancy spring mattresses, curled hair, or feathers to repose upon, and instead of stripping himself and crawling under a pile of woollen blankets, as we do, he lies down in his ordinary clothing, and rarely has anything else over him, unless it is a single blanket when the weather is unusually cool, or the room is open and subject to drafts. He does not destroy his lustrous black hair by burying his head in a hot feather or curled hair pillow, as we do, but has a block of wood or a cylindrical pillow, of braided cane open at

both ends for ventilation, which he places just under the top of his neck. This keeps him from becoming bald-headed, and is uncomfortable enough to make him an early riser; but like all other systems, it has its disadvantages. In time it throws his neck out of line, giving it a permanent forward bend, not graceful in itself, and rather unpleasant for an outside barbarian to look upon. When he travels he usually carries his favorite pillow with him, and at his death his head rests upon it in his coffin.

Two of the beds in this room were occupied when we came in, the other was vacant. On one a Chinese was stretched at full length upon his back, in utter unconsciousness; his eyes were wide open, but apparently receiving no impression from the objects before them, and there was a vacant, meaningless smile upon his sallow countenance. His opium pipe or stick lay on the couch beside him, having fallen from his hand, and near his head stood the small, nut-oil lamp, with a glass cover like an inverted tumbler with a hole in the bottom, the tiny taper burning low in the socket.

The other Chinese, who was well dressed, and probably a merchant or manufacturer of the second class, was just preparing to indulge in his nightly dissipation. He did not appear to relish our intrusion, but said nothing, and went on with his smoking. Each guest who pays his fifteen cents receives from the clerk in attendance a small oyster or clam shell, on which there is a little dab of prepared opium, in a semi-fluid condition, resembling, in appearance, thick treacle or partially dissolved "stick licorice," such as we used to buy with our odd pennies at the grocery store at the corner, in the happy days of youth, when we had a terrible cold, and obtained permission to remain at home from school and indulge in the luxury of medicine of our own choice. A slender bamboo stick about three feet in length, hollow down nearly to the largest end, where a little tunnel-shaped brass bowl is inserted, which is the usual opium pipe, a bit of wire about a foot in length, and a nut-oil lamp such as I have described, are also given him, and his "outfit" is complete.

The man who was about to indulge in the luxury stretched himself at full length on the couch, turned on his left side, placed the end of the wire in the opium, twirled it around so as to take up a mass about the size of an ordinary garden pea, formed the mass with his finger into a ball, held the end of the bamboo pipe to his mouth, placed the brass bowl at the other end against the flame of the lamp, slipped the ball of opium off the wire dexterously into the bowl, and as it burned he inhaled the smoke slowly into his lungs, allowing it to escape in little jets at long intervals from his nostrils.

By the time he had taken the third or fourth whiff he was evidently affected. His eyes began to grow dull, his breathing was slow and heavy, and his grasp on the pipe relaxed little by little. In two or three minutes his muscles appeared to relax, his head fell back, and he was in a condition half sleep, half stupor. The doctor explained that the effect of this first smoke would wear off in half an hour or so, when the man would repeat the dose once or twice, and finally become wholly insensible for several hours. We spoke to him, but he did not answer, and it was hard to tell whether he was really unconscious of our presence or merely indifferent to it. It is asserted that the opium smoker sees nothing of what is going on around him, but revels in the most blissful creations of the imagination, his soul sailing away, as it were, from the dull and common-place surroundings of his body, to walk hand in hand with the "black-eyed girls in green" through the fair gardens, among the palm groves, by the banks of the rivers of Paradise. I said as much: the colonel characteristically denounced this practical version of the matter as "all blamed stuff, rot, and humbug. It makes them drunk, just simply blind, stupid drunk, and nothing else!" He had tried it and knew. The doctor said one dose would not produce any serious effects, and against my better judgment I permitted them to persuade me into making the experiment.

The landlord started off to bring my allowance of opium, lamp, pipe, etc., and the colonel improved the opportunity to illustrate his theory that the opium smoker is not absolutely

insensible to pain, like the patient who inhales chloroform, but simply too drunk to resent the imposition which produces it. Tearing off a little slip of cane from the edge of one of the couches, he went up to the wholly insensible customer on the couch, and inserting it in his nostril twirled it swiftly around. A sharp sneeze and a convulsive winking of the dull eyes followed, but no other movement was made by the sleeper. "There, you see now that I am right! If he had taken chloroform he would not even sneeze; his nerves would be utterly incapable of receiving a sensation."

Turning to the other customer, who now lay like a log on his couch, he drew his penknife, opened it, then, changing his mind, put it back, and taking a pin from his vest, inserted it quickly in the calf of his victim's leg. The other leg, which was hanging half over the side of the couch, straightened out with a quick, convulsive movement, and the toe of the heavy felt and wooden-soled shoe on the foot came in contact with the colonel's shin with a vicious energy, which sent him dancing back to the doorway with a remark which did not sound like a blessing, just as the proprietor came in with the opium and its accessories. "Why the —— don't you make your customers take their boots off when they go to bed?" the colonel demanded savagely of the smiling and obsequious master of the house, as he rubbed his shin and cast a glance of hatred at the recumbent form of the lodger who had proved such a poor subject for experiments. "Me no shabbee!" was the non-committal reply.

I lay down on the bed and placed myself in the orthodox position, the doctor resting himself at my head, and the colonel rolling a cigarito and settling down on the edge of the couch at my feet. The host prepared the opium, placed it in the pipe, presented the end of the stick to my lips, and told me, after his own fashion, to pull away. I pulled, and began choking and coughing. The first experiment was a dead failure; the next was more nearly a success, and I felt my head rapidly assuming the dimensions of a sugar-barrel while my body and legs appeared to be shrinking proportion-

ately, all their bulk being drawn up towards and into my head. I felt as I imagine drowning people feel, and gasped convulsively for breath. I could not recognize anything around me for a moment, and then I saw the dark eyes and long mustachios of the colonel coming out of a cloud of smoke and making directly for me at lightning speed, like a hairy comet flying through the air. The idea flashed through my brain that he was about to burn a match under my nose, or commit some similar atrocity by way of an experiment "in the interest of science," and as one struggling in a horrible nightmare I sprang off the bed, staggering around without being able to feel my feet under me, and groping blindly about for something to seize in order to steady myself.

There was a low, dull humming in my ears, a giddiness in my head, and a general sense of faintness and nausea pervading my entire system. "For God's sake, take me out of this!" I cried, at last; and some time after I realized that I was being walked up and down the sidewalk, the doctor and the colonel supporting me on either side. My head was getting clearer, but I felt deadly ill. The faint, sickening odor of the opium fumes clung around me and oppressed me, and I said as much at last, as I leaned heavily against a lamp-post.

The colonel with his usual enthusiasm exclaimed, "O, yes, I see it; you want a good strong stimulant of some kind to help you get rid of it. Now, I know a Mexican over on the corner of Vallejo Street, who has got some double refined *Mescal*, which will dissolve a gun-flint in half an hour; one good drink of that will set you all right."

"Not if I know myself aright!" I remarked, emphatically. "You are the most hospitable people I have ever fallen in with. Your good intentions are unbounded, and your kindness I never can forget, but I don't want any *Mescal* to-night. I have made a sufficient number of new acquaintances for one evening. Pisco, Cocomongo, Betel, Samshoo, and Opium, are all very fine in their way, but the new things are crowding each other a little too fast. We will omit the *Mescal* on this occasion; I want to go home!"

They called a hack, and we rode back to the Occidental in silence. This was my first experience in a San Francisco opium den.

It will also be my last!

Next morning the colonel called on me and said he had forgotten something — an opium den worse than the one we had seen.

"How's that?" I asked.

"Why," said the colonel, "it is an opium den of a very romantic character. Some years ago the line of Jackson Street was changed by the city authorities, and it became necessary to build new sewers. The old sewer was given up, and in the new arrangements it was under some of the buildings occupied by the Chinese. They took possession of it, and hollowed out galleries on either side. The enterprising proprietors converted it into an opium palace, at the popular admission fee of two cents. The accommodations and odors are a hundred-fold worse than those of the place where we were last night. For two cents you can get smells enough to last you a lifetime. Do you want to go?"

I concluded that I wanted nothing more in the opium line, and declined to go. I may have been too fastidious, but I had not then travelled as much as I have in later years, and novices, you know, are inclined to be particular.

A sewer, whether abandoned or not, has few charms. At St. Louis there are, or were when I was last there, some of the smaller sewers that are so broken at their mouths, near the river's edge, as to present the appearance of natural springs where the water oozes up through the sand. One day a gentleman was standing near one of these sewer mouths, when two countrymen came strolling along the bank, one of them thirty feet ahead of the other. As the foremost of the twain spied the water slowly pouring from the earth, he shouted to his friend,—

"Hullo, Jim; here's another spring!"

"Well, Gaul darn it," answered the other, "if tain't no better water than the last we found I don't want none of it."

LV.

GOLD AND ITS USES.

ANTIQUITY OF GOLD. — ITS WORSHIP. — ANCIENT GOLD MINES. — KING SOLOMON. — GOLD IN AMERICA. — STORY OF A HUNTER. — THE SHEPHERD AND THE CHILD. — HOW PIZARRO EUCHRED THE PERUVIAN KING. — SUTTER'S FORT AND SAW-MILL. — MARSHALL'S DISCOVERY IN THE MILL-RACE. — ROMANCE AND REALITY. — SPREADING THE NEWS. — NAVIGATION UNDER DISADVANTAGES. — THE GOLD EXCITEMENT. — THE PAN AND ROCKER. — THE AUTHOR AS A GOLD MINER. — HOW HE WORKED THE ROCKER. — HARRY AND HIS TIN DIPPER. — DISAPPOINTMENT AND DINNER. — VICISSITUDES OF GOLD MINING.

THE most valuable metal generally known is gold, and it is likewise one of the most ancient. It is found in various parts of the globe, and is sufficiently scarce, and sufficiently hard to obtain, to make it precious. No doubt there is enough of it in the composition of this globe, if it could be easily obtained, to make it a very common metal. An Irishman once said, speaking of the gold mines of California, that there was sufficient of the precious metal there, but it was terribly mixed up with dirt. If it were not for this mixing with dirt, and the difficulty of separating it, all of us might have gold enough and to spare, though it is quite possible that it might be of no more value than tin or brass.

The peculiarity of gold is, that it is never obtained entirely pure. Silver is always alloyed with it, but in no definite proportions. One of the purest specimens ever obtained gave, when analyzed, ninety-eight hundredths of gold, while the remaining two hundredths were about equally divided between silver and copper. Sometimes gold is found alloyed with silver in about equal proportions.

Gold is frequently referred to in the Scriptures, both in the

Old Testament and in the New; in one of the earliest books of the Old Testament many applications of gold are described similar to those of the present day. It was beaten into plates, drawn into wires, and even woven with threads of linen for priestly robes. It was fashioned into breastplates, wrought into chains, and used as a setting for precious stones.

Sometimes it was made into gods and idols, and in some parts of the world it is worshipped as an idol up to the present day. A great many men and women in this nineteenth century worship gold more earnestly and more devotedly than they worship anything else.

The ancients, when they wrought their gold into idols, evidently had a keen perception of human nature.

An idol of iron or of wood may be of little account; but let one be made of gold, especially of solid gold, and with diamonds for eyes, and the whole world will fall down and worship it.

Where the ancients obtained their gold is not positively known, but it is supposed that it was brought from Africa or the East Indies, for the reason that the fleet of Solomon, in addition to gold, brought back ivory, spices, precious stones, ebony, peacocks, apes, and sandal wood. The cargoes of King Solomon were evidently of a widely assorted character, and doubtless found a good market. Gold mines were evidently worked in the desert of Gobi in the early days, and along the Ural Mountains there are now found the traces of ancient mining operations supposed to date back to the time of King Solomon.

In the time of the Romans gold was not so abundant, and in the middle ages the production was very small. At the date of the discovery of America, it was estimated that the whole amount of gold and silver in the old world was about one hundred and seventy millions of dollars, and that the supply obtained each year did not exceed the loss by wear and other forms of destruction.

To enumerate all the gold mines of the world would require much more space than I have at my disposal. Nearly all parts of Europe contain deposits of the precious metal, though

in many places where the ground is known to be auriferous the deposits are too poor to pay the expenses of working. The richest gold mines of Europe are in Russia, particularly along the Ural Mountains. The eastern slope of the Ural Mountains is more productive than the western, and the richest portion of Northern Asia, so far as gold is concerned, is in Eastern Siberia. Gold mining in that region, although not productive, is comparatively in its infancy, and great results may be looked for before many years. Until quite recently all mines in Russia were owned by the government, and were operated by officers in the interest of the crown. The result was, that there was very little enterprise displayed in mining operations. The officer in charge of a mining district would be unwilling to take any active steps, or run great risks in the explorations in the interest of the gold mines, as he would know that if he failed to return a profit to the government he would very likely lose his place. Consequently nearly all the mining operations were conducted on a sure basis.

Some years ago the Russian government changed its policy, and began throwing open its mining works to private enterprise, exacting from the miners a liberal percentage of the gross amount of gold and silver which they had obtained. The result was, that under the stimulus of the enterprise, — in which private organizations will always excel the government, — the mining interest in Russia increased rapidly, and the government now obtains from its percentage a much larger annual revenue than it had obtained before from the gold.

The discoveries of gold in America date from a very early period. There were large quantities of gold and silver in the hands of the Peruvians and the Aztecs at the time of the famous expedition of Pizarro and Cortes. A story is told of one of the captured kings of Peru, who, in order to secure his ransom, agreed to bring together in two months gold and silver enough to fill his room. This would have been a sufficiently great undertaking had he been confined in an ordinary

prison cell; but his captor, with an eye to business, had put him in a large apartment, suited to his royal state. The room is said to have been twenty-two feet long, seventeen feet wide, and nine feet high. Such was the richness of Peru in the precious metals, that the old king had no doubt of his ability to meet his contract; and he did fill the room in the time. When his work was finished, and the metal was melted, it was found that he had collected over fifteen millions of dollars — a very handsome sum to pay for his liberty, which he did not get after all.

From the time of the discovery in America until 1520, there was more gold than silver exported to Europe; but about that time Mexico was conquered, and large quantities of silver were obtained. In the first three hundred years succeeding the discovery of America, the receipts of American gold were estimated at three and a half times the production of the old world, and those of silver at twelve times the amount of this metal produced outside of America. Gold was dug in America many hundreds of years ago. In some portions of Georgia the ruins of ancient huts and utensils were uncovered a few years ago in working some of the mines, and they are supposed to have belonged to a race of men now extinct, though it is contended by some persons that these gold works belonged to the period of Ferdinand de Soto. In the early part of this century gold mines were successfully worked in the Carolinas, Georgia, and other states; but latterly the yield from these mines has greatly declined, and the returns of gold are quite small.

The discoveries of gold in California in 1848, and in Australia three years later, are events in the history of the human race of more importance than the discoveries of Mexico and Peru in the days of Cortes and Pizarro. These discoveries have given a new impetus to the migratory population of the whole world, built up large cities and regions where before there was only a wilderness, carried civilization and commerce where they were never known before, brought together strange people of all nations, mingling them in harmony side

by side, and have done more, perhaps, in the cause of universal peace and good will among all nations than any other discoveries of the present day.

In California, more than in any other part of America, people of all nations are assembled. In the streets of San Francisco one may see the synagogue, the church, and the pagoda. Christian and pagan, Jew and gentile, are mingled in the crowds that pass along the streets, and they are found laboring side by side to obtain the chief end of a large part of human existence — the possession of wealth.

The discovery of gold in California, like many discoveries of gold and silver elsewhere, was not the work of science. It very often happens that those find who do not seek. A shepherd, a poor laborer, and even children are chosen by Nature to reveal to the world the treasures which she holds beneath the surface. It was not Columbus, nor Cortes, nor Pizarro who discovered the silver of South America, but an Indian hunter. The most famous silver mines of Peru were found in the same way. One day a shepherd, leading his flock to feed on the slopes of the Andes, lighted some bushes to prepare his frugal meal. A pebble heated by the flame attracted his attention through its brightness, which reflected the rays of the sun. He found the stone massive and heavy, and finally carried it to the mint at Lima, where it was tested, and proved to be silver. The poor shepherd through his discovery became a millionaire.

A hunter, climbing the rocks in search of game, pulled up a bush, and found pieces of silver imbedded in the earth which the roots retained. A child, playing one day in the valley near the cottage of a poor peasant in Russia, picked up a shining pebble, and brought it home. The pebble was found to be very heavy, and on examination proved to be of gold. Investigations followed this discovery, and an extensive gold field was opened.

The discovery of gold in California was accidental. Captain Sutter, who had seen many vicissitudes and adventures in Europe and the wilds of America, arrived in California in

1839; and two y obtained a grant of land, and built a fort, which soon e refuge for people coming into the country. The pi e of California all bear testimony to the generosity of n Sutter at the time when his fort was the capital, and was king of the American colony in the valley of the mento. The legislature of California a few years ago reco ized his claims to the generosity of the people of the l fic coast by granting him a small pension for the remainder of his life.

Captain Sutter erected a saw ill on the south fork of the American River, at a place now alled Coloma. On the 19th day of January, 1848, James . Marshall, while engaged in digging a race for the saw-mill, found some pieces of yellow metal, which he and the half d en men working with him at the mill supposed to be gold. He was confident of the importance of the discovery, but he knew nothing of chemistry or gold mining, and therefore could not prove the nature of the metal, or know how to ob ain it in paying quantities. Every day he examined the mill-race to look for the metal; every man at the mill thought arshall was very wild, and so paid little attention to him. The swift current of the mill-race washed away much of the earth, and by this means particles of gold were left behind.

In a little while Marshall had quite a collection of specimens, and his associates began to think that possibly there might be a gold mine there after all. About the middle of February, one of the party employed at the mill went to San Francisco, and took these specimens with him. He was introduced to a gold miner from Georgia, who was immediately satisfied of the character of the metal, and knew that the diggings must be rich. This miner, Humphrey by name, determined to go at once to the mill, and examine the digging.

He arrived there on the 7th of March, and found work going on at the mill just as if there was no gold within a thousand miles. The next day he took a pan and spade, and washed some of the dirt from the bottom of the mill-race; and in a few hours he pronounced the mine the richest he had

JAS. W. MARSHALL, THE DISCOVERER OF GOLD IN CALIFORNIA

SUTTER'S MILL, WHERE THE FIRST GOLD WAS DISCOVERED IN CALIFORNIA.

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ever seen or known in Georgia. He then made a rocker, and went to work washing for gold, and every day he obtained an ounce or two of metal. The men at the mill made rockers for themselves, and all were soon busy in searching for gold. Everything else was abandoned.

The rumor of the discovery did not spread rapidly. In the middle of March the owner of a large rancho at the head of the Sacramento valley visited Sutter's fort, heard of the mining at Coloma, and went to see it. He said that if similarity of formation could be taken as proof, there must be gold on his rancho. So, after ascertaining the mode of washing, he posted off, and in a few weeks was at work on the bars of Clear Creek, nearly two hundred miles from Coloma. A few days later, another man visited the mill, and the result was, that in less than a month, he had a party of Indians washing gold on Feather River, twenty-five miles from Coloma. Thus the gold mines were opened almost simultaneously at distant points.

The first printed notice of the discovery of gold was given in a newspaper published in San Francisco, on the 15th of March. On the 29th of May, the same paper announced that its publication would be suspended, and said,—

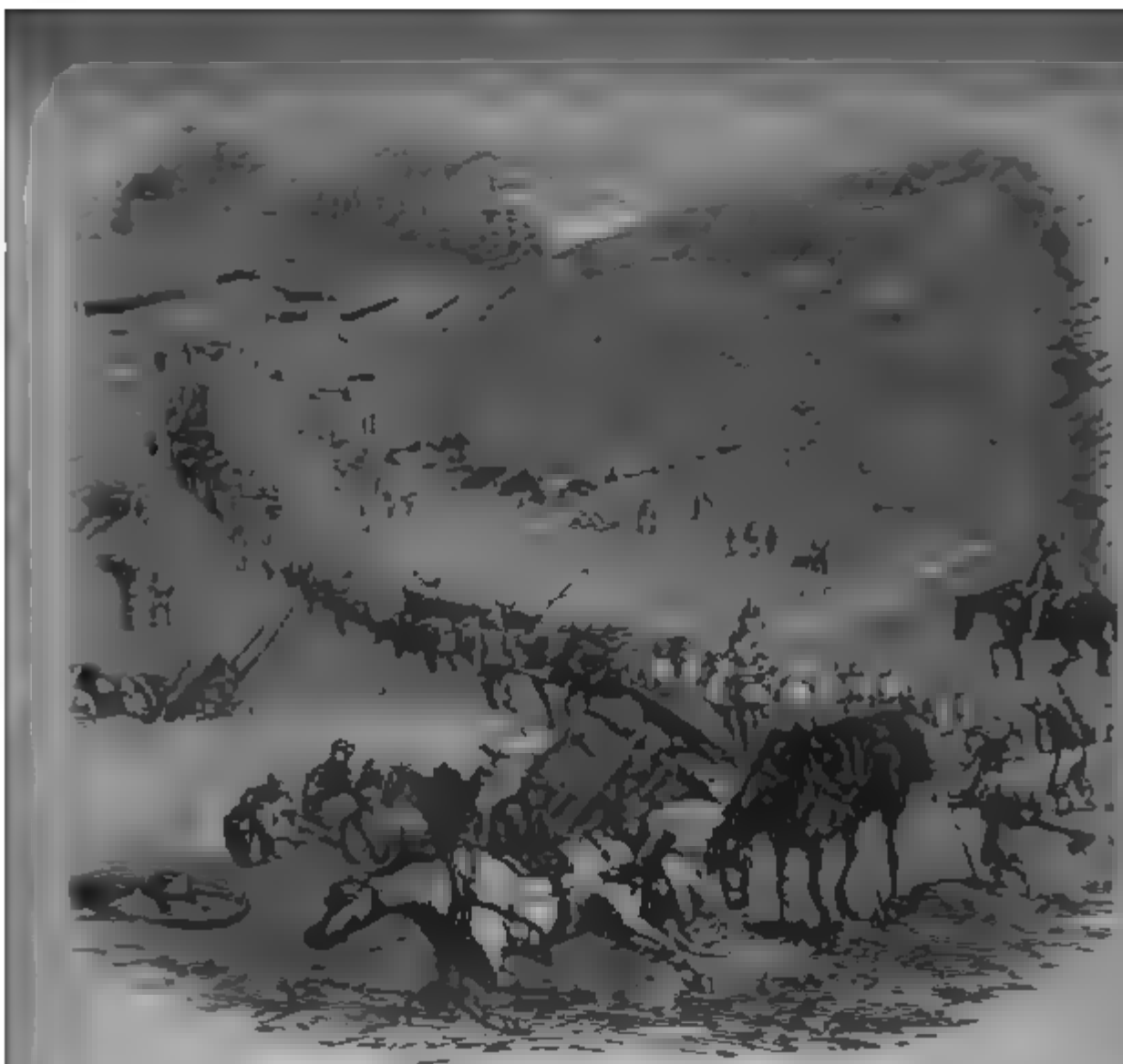
"The whole country, from San Francisco to Los Angeles, and from the sea-shore to the base of the Sierra Nevada, resounds with the sordid cry of, Gold! gold! gold!—while the field is left half planted, the house half built, and everything neglected but the manufacture of picks, and shovels, and the means of transportation to the spot where a man obtains one hundred and twenty dollars' worth of the real stuff in one day's washing, and the average for all concerned was twenty dollars per diem."

The towns and villages were deserted. Farmers left their fields, and the crews of ships at anchor in San Francisco Bay deserted: soldiers left their posts; herdsmen abandoned their charges, and everybody made the quickest possible speed to the mines. Merchants of San Francisco found their clerks leaving their counters, and in many instances, after struggling

against fate, finding themselves alone, without assistance and unable to obtain any, they closed their shops, and followed the example of their subordinates.

It is related that one day a ship came into port, having taken a pilot outside the entrance to the bay. The pilot, in the hearing of some of the crew, told the captain of the wonderful discovery, and, as he afterwards acknowledged, exaggerated the real state of affairs very considerably. The ship came to anchor about sunset, and was to be moved to her dock the next morning. When the captain went on deck to wait the arrival of his pilot, he found nobody on board. The sailors had heard the story of wonderful fortunes to be obtained in the mines, and they had stolen a boat, and gone ashore. The first and second mates had followed the example of the men, leaving the captain to his solitary ship. The pilot came off, as agreed. He was a conservative old grandfather, who did not believe in making money; otherwise there would have been no pilot at all. He told the captain that it was useless to try to get the ship to the dock, or do anything with her; and the latter, after thinking the matter over, concluded it would be best to leave the craft at anchor, put her in charge of a keeper, if such a man could possibly be found, and make a journey to the mines himself.

The first specimen of gold sent from California to New York was forwarded to the editor of the New York Herald, the paper which was first on the Atlantic coast to announce the discovery. The first rumors were received with incredulity and ridicule, but very soon the specimens of the precious metal coming in considerable quantities, and the enthusiastic letters of officers of the army and men of good repute, changed the current of feeling, and an almost unparalleled excitement began. It spread through Europe and Asia, and the thirst for gold was universal. In 1847 the population of California altogether was not fifteen thousand; in 1849 the great rush began, and it was estimated that, during the six months from the 1st of July, 1849, to the 1st of January, 1850, ninety thousand persons arrived in California from Mexico, Chili, Peru, the Sandwich Islands, United States, and Europe. Of this ninety



EMIGRANT TRAIN OF GOLD HUNTERS IN 1849.

CHINESE GOLD MINING IN CALIFORNIA

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thousand, such were the hardships they had to endure, and the privations to which they were subjected, one fifth of the entire number perished by disease within six months succeeding their arrival.

Before 1850 the population of California had risen to one hundred thousand, and it has been increasing ever since. Its population ten years later was estimated at about seven hundred thousand.

It is a curious fact that most of the rich placer diggings in California were discovered within three or four years of the discovery at Sutter's mill-race. Some rich deposits have been found since that time, but none of them of any great importance. The placer fields of California to-day are pretty nearly worked out, and the most extensive mining of that state is now prosecuted by machinery.

The earlier diggings were in the valleys or streams or in gulches, opening into the valleys. The washings were first conducted with a sheet iron pan, held in the hands of the miner, who could wash only a few quarts of earth at a time. An improvement upon the pan was the rocker, a box arranged so that it could be rocked like a cradle, with no board at one end, with a few slats nailed across the bottom to catch the gold, and having a piece of sheet iron on the top pierced with holes a quarter of an inch in diameter. Earth was thrown upon this iron, and water was poured on. The cradle was set upon a slight incline, so that the stones rolled off at the end, while the water, with the earth, sand, and gold, was carried through. The gold caught upon the riffles, while the lighter substances were washed away. Nuggets, or large pieces of gold that would not pass through the holes, were sometimes thrown out with the stone and lost; but the danger of such an occurrence was not very great, principally for the reason that nuggets were not alarmingly abundant.

Two men were required to work a rocker. It was placed by the side of a stream, and one man grasping its handle with one hand, flourished a dipper in the other. His companion brought the auriferous earth to the machine, and threw it upon the iron. Man number one would then throw a quantity of

water upon the earth, and agitate the machine as rapidly as possible. The earth and water would become mixed, and pass through the holes, and the stone would roll away from the end of the cradle. It was necessary to keep the water running pretty briskly on the top of the machine, and likewise to keep it well supplied with earth. By the end of the day's working at this business, the two men would be delightfully wearied and ready to engage in almost any other honorable and profitable pursuit, especially a profitable one.

My first experience with a rocker was not of an agreeable character. Accompanied by a friend, I went to a locality where it was reported that a miner a few days before had obtained eight hundred dollars in a single day. We were willing to begin at that rate, though we were confident we should make a thousand a day before the end of the week. We carried our tools to the spot, and having placed our rocker, began work. I worked the machine, and Harry, as I will call my friend, supplied it with earth. I placed the machine by the side of the stream where I could easily dip out the water, and told Harry to begin.

For about an hour the machine did very lively work. Whenever I lagged, Harry would remind me of the eight hundred dollar man. Then I would give an extra flourish to the tin dipper, and pile on an extra quart of water. I kept Harry busy bringing earth, and he kept me busy washing it away. At the end of an hour or so we thought we would see how things were getting on.

I raised the lid, examined the riffles, and not a particle of gold was to be seen. The result was not encouraging, and I told Harry we had better move a little way down the stream, and try it again. We did so.

This time Harry took the rocker, and I went into the shovelling business. We made things lively for another hour. Harry was sure we were right this time, as the earth was of a different color, and the water, as it ran from the machine, was so yellow, that it certainly must be tinged with gold. What we most feared was to lose the big nuggets that might roll out from the rocker, and so we examined every stone with

GOLD WASHING IN THE CALIFORNIA MINES.

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all the care of a geological student; but somehow there was not a nugget among the whole lot, and after a while we thought the nugget business was played out.

When we had been in this new place an hour, we concluded to adjourn for dinner. Harry wanted to look into the rocker, but I told him our appetites might be better if we waited until after dinner for the examination. Our dinner was a very plain one, consisting of a piece of bread that might have been sold for a brick, and a slice of pork that had probably come down from the Silurian period.

We were temperate in drinking; that is to say, we drank nothing but water, and it may be proper to add, that we had nothing but water to drink. During the meal we consoled and congratulated ourselves upon being in the eight hundred dollar region. We had counted in the morning upon making at least that sum, but now we were willing to put up with four or five hundred. Our air castles were reasonably gorgeous, though somehow the pains in our backs and legs, diminished their brilliancy.

When our meal was finished, we raised the lid and began examining the rocker. This time there was something in the riffles, and we exulted. Close examination, however, showed that there was nothing there except black sand, a few small pebbles, and three or four particles of gold, each about as large as a pin's head. We changed our base of operations, and moved again to a new spot.

I do not think either of us was ever harder worked and more weary than at the end of that day. We had pains enough all over our bodies to set up a window market, and if we did not sleep well that night, it was not for lack of weariness. We were a trifle disgusted to find that in our verdancy we had been washing what the miners call "strippings," that is, the surface earth which lies above the pay dirt. We might as well have washed the sweepings of Broadway, and hope to obtain gold. We learned something by experience, as a great many others have done. "Working the rocker," we concluded, was too severe for lazy men, and we speedily gave it up.

LVI.

GOLD MINING.

VARIOUS WAYS OF MINING GOLD. — SLUICING AND HYDRAULIC MINING. — ACCIDENT TO A MINER. — A NARROW ESCAPE. — POWER OF WATER IN HYDRAULIC MINING. — EFFECT ON RIVERS AND BAYS. — A SCENE OF DESOLATION. — QUARTZ MINING. — QUICKSILVER AND ITS AMALGAM. — STOCK OPERATIONS. — THE MARIPOSA MINES. — THE AUTHOR'S VISIT. — HAYWARD'S MINE. — MANIPULATION OF MARIPOSA. — FUNNY STORY OF A SEA CAPTAIN. — HOW HE SUPERINTENDED A MINE. — HIS MANAGEMENT OF A MILL. — ACCIDENTS ON PURPOSE, AND HASTY FLIGHT.

UNDERGROUND work in gold mining does not properly begin with the surface washings. It is true the earth is torn out, and large excavations are made; but they are all done by the light of day, and where the open air circulates through them. As heretofore stated, the primitive form of gold-digging is with the pan and the rocker. After the rocker, there are several forms of sluicing, or washing away of the earth. The ordinary construction of a sluice is a long box, with a current of water running through it. The earth is thrown into the sluice, washed towards its lower end, and carried away by the water. The stones, of various sizes, are thrown out with a shovel or fork; the gold and black sand fall by their weight, and are caught in the riffles, or cleats, nailed across the bottom of the sluice. Earth which will not pay for working with the pan or rocker can be made profitable in this mode of operation, for the reason that one man or two men can wash with the sluice many times the quantity of earth that they could work with the primitive process.

Another form of sluice, known as "Long Tom," is generally elevated upon posts, a foot or two above the ground. At its upper end there is a covering of sheet iron, very much like that which covers the rocker. Another system of surface

mining is that which is known as hydraulic mining, and by means of it, earth that will not pay for washing in any other way can be worked to advantage. By this process the miners will tear down large banks and hills, and wash them entirely away. The process was invented in 1852, by Edward Mattison, a native of Connecticut, and introduced by him to great advantage. The water is conducted through iron tubes, terminating in a flexible hose with a nozzle like that of a fire engine. The "head" of the water must be many feet higher than the place where it emerges from the hose, so as to give an enormous pressure.

Equipped in this way the miner washes away the base of the bank. In a little while the upper part falls, and as the gravelly ground is composed of pebbles, and is naturally rather loosely consolidated, large masses of the hill come down with a violent crash. The greatest danger to life in this kind of mining is in the falls of the earth.

I was once at a place near Grass Valley, California, where they were at work by means of hydraulic mining. A large cavity had been cut away under the base of the hill with the streams of water. Every moment the hill was expected to fall, but somehow it seemed to retain its position. One of the men incautiously ventured near it, and just as he had done so, the earth fell, and the man was partially buried beneath it. He screamed loudly with pain. His companions rushed forward to relieve him, when another mass of earth fell, partially burying two of those who had come to his rescue. Other men went to their assistance, and in a little while the three were extricated.

The first man had his leg broken, and one foot badly crushed. The other two were severely bruised, and the foot of one of them was permanently injured. It frequently happens that in this way men are killed or injured partially through want of caution, and partially owing to the dangers inseparably connected with hydraulic mining.

The force of water thrown in this way, with an enormous pressure, is almost wonderful. The solid earth is cut and torn

away, and sometimes stones weighing several pounds are tossed into the air. The particles of earth fly in all directions. The water rebounds sometimes, and in a little while the men who manage the hose are thoroughly drenched. On a level surface a stream of water directed upon the solid earth at an angle of twelve or thirteen degrees, will cut a trench or furrow with the rapidity of a plough. When the earth falls, the largest blocks are broken up with the pick or with the streams of water, and the *débris* is thrown into a large channel, or flume, at the basis of the hill where the work is going on. The flume has riffles at its bottom, and many turnings, so that the gold may be saved. The stream of water carries away the earth, and leaves the gold behind.

There is no system of mining more destructive than this. Hills are cut away, and sometimes, for many acres, the rock is laid bare. The whole scene is one of desolation. The earth that is washed down fills the channels of rivers, and is sometimes carried a long distance. Before California was opened for gold mining, the water of her streams was perfectly clear; but since the beginning of mining the streams have lost their pellucid character, and the discolored water extends to the Bay of San Francisco, and sometimes out to sea. The lower part of the Sacramento River has been partially filled up, and there are parts of the great bay which are now much shallower than of old.

As the surface diggings of California showed signs of exhaustion, attention was given to mining in quartz rock. In the ledges of the mountain-sides veins were discovered rich in gold, and pieces of the rock taken from these veins gave promise of profitable working.

The man with pick, and pan, and rocker required but little capital for the prosecution of his enterprise; but mining in the quartz rock requires money to conduct it. Shafts must be sunk, and levels must be driven; the ore must be raised to the surface, the rock must be pulverized, and the gold extracted; and the machinery to accomplish this is more or less elaborate, and always costly. The mines are worked in the

MINERS PROSPECTING.

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same way as other underground mines. The shafts, the levels, the tunnels, are the same; but after the ore is raised, there is a great expense attending its reduction. The rock must be broken, and placed in pulverizing machines, and after it is crushed, whether by rollers or stamps, the gold must be separated.

The water which carries away the gold is made to flow where it comes in contact with quicksilver placed along a series of riffles. In many instances blankets are spread, over which the water flows; and as the gold comes in contact with the rough surface of these blankets, it is caught and held.

Some of the gold miners in California invented a table of amalgamated copper, on which quicksilver was spread, and the ore coming in contact with it was stopped.

There are other inventions for the same purpose. In one the pulverized ore is agitated in a bath of quicksilver, and in another an inclined trough is divided into compartments filled with quicksilver, in which a series of forks have an oscillating movement, to bring the sands in contact with the fluid metal as they flow through the troughs. Sometimes sheep-skins are used inside of blankets, so that the golden fleece can be considered an affair of modern times, as well as of the earliest days of ship-building.

In working the placer mines by the hydraulic process, the miner can manage with profit the dirt which contains only a millionth part of gold.

In the quartz mining, the proportion of gold ought naturally to be greater, since it is necessary to execute all the work, which is partly done at the placers by nature: that is, to dig, transport, pulverize, enrich the ore, and finally amalgamate it.

In California the quartz ores of least hardness cannot be worked profitably when they yield less than five dollars' worth of gold to the ton, or about one hundred thousandth proportion. Quicksilver is mainly employed in the auriferous quartz ores. When the gold of the placer is very fine, and invisible to the eye, or the work is done by means of long channels, riffles filled with quicksilver are placed in the bed of the stream,

which detain all the gold in its passage, no matter how small the particles. The scales of gold which come in contact with this fluid are instantly caught up, and no process has yet been invented which can supersede that of quicksilver.

The amalgam obtained in this way is generally liquid, but it is allowed to take up sufficient gold to give it the consistency of paste. It is passed through a chamois-skin folded into a bag, and twisted like a piece of wet linen. The quicksilver, being separated from the gold, passes through the pores of the skin in the form of silver drops, and is caught in a basin beneath. The gold must now be separated from the paste, and the amalgam left behind resembles a ball of tin. Quicksilver dissolves gold just as water dissolves sugar, but the quicksilver can be driven away in vapor, and the gold will remain. The amalgam can be made to give up its gold in the same way that a solution of sugar and water can be made to yield sugar candy. In this way gold may be considered the sugar candy of the miner.

The balls of amalgam are placed in an iron retort, which is heated in a furnace. At a high temperature the quicksilver boils, and ascends in the form of vapor towards the neck of the apparatus. The neck of the retort opens into a tub of water, which condenses the vaporized quicksilver, and causes it to fall to the bottom.

When the operation is concluded, the quicksilver is at the bottom of the tub, and the ball of gold is in the retort. With the quicksilver driven out, the gold has a porous and spongy appearance. It is remelted in crucibles, and then cast into bars. If the operation is properly conducted, hardly any of the quicksilver will be lost. I have known instances where miners have used a quantity of quicksilver twenty or thirty times over, with hardly any appreciable diminution of its weight.

A great many quartz mines have been opened in California, Colorado, and other portions of America. Some of them have returned much less money to their stockholders than to the men who organized the companies. During the height of the

mining fever, it was comparatively easy to organize a company, where a man had any reasonable supposition that a mine existed. All through California quartz mines were opened, but those which have paid a profit to the operators could almost be counted on the fingers' ends. The most profitable centre of quartz mining is in the vicinity of Grass Valley, a short distance from the line of the Central Pacific Railway. Most of the mines opened there have been profitable, though there are some which never made any money.

The richest and most famous of the Californian quartz mines is the one known as Hayward's. Its early history was one of disaster, but for several years it has been paying a steady and handsome profit to its owner. I remember, on my arrival in San Francisco, a resident of that city told me of Hayward's case.

"Hayward," said he, "used to have a hard time of it, but now he takes things easy. He spends most of his time in San Francisco, and once in every fortnight he goes up to the mill, and orders them to 'clean up.' They clean up; the gold is retorted, and he brings it down here. He has a clear income of ten or twelve thousand dollars a week from the mine, and appears to enjoy himself."

Probably the most famous mines of California, and those which have swallowed up the most money, are the Mariposa. Mariposa is a Spanish word, meaning "butterfly;" and there never was a more gaudy butterfly, to catch the eye of a speculating public, than the Mariposa of California. General Fremont obtained a grant of land on which the mines are located, and he organized a stock company, which was expected to return an enormous revenue; somehow the golden promise did not turn out brilliantly, and those who invested became heavy losers.

Mariposa went down, and carried with it a great many confiding men. By and by it came up again, and a new speculation was started. More money was invested, with pretty nearly the same result as before; and so it has gone on up to the present time; and once in a while there is a speculation

in Mariposa. Somebody wins a great deal of money, and somebody loses a great deal.

My only visit to the Mariposa mines convinced me that they are good things to make money out of, provided they could be operated to a great profit. There were five large mines on the Mariposa grant. Only one of them was at work, and at this one the superintendent politely refused to allow us an opportunity for inspection. He said they were taking out a fair amount of gold, but he thought their amalgamating process was not perfect; and consequently the shareholders could not expect a large dividend. It is possible he would have granted us permission to descend into the mine; but as two men had been killed recently in one of the tunnels, and a man, not long before, had fallen down the shaft, we concluded it was altogether too good a place for accidents, and one that we did not care to inspect.

The ways of the quartz miners — that is to say, of the owners of the mines — are something wonderful. Thousands of mines have been managed by men no more competent to superintend mining than to construct a new solar system. Some years ago I made the acquaintance of a sea captain who had retired from the service, and concluded to go into business. He had begun life as a cabin boy, having run away to sea. He next sailed before the mast, and had gone through all the grades, until he was qualified to be master of a ship. He had a brother-in-law who was a director in a mining company, and the directors, in their infinite wisdom, concluded that this retired sea captain, whose sands of life had not altogether run out, would make an excellent mining superintendent, as he was good for nothing else.

On what reasoning they based their determination I do not know. He had never seen a mine in all his life, and could not tell the difference between a piece of granite and a fragment of gold-bearing quartz. I met him one day, and he told me he was to start on the following morning for the scene of operations, where he would take charge of a mine. I lost sight of him for several months, but one day met him on

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Broadway, looking as if he had just been sentenced to the penitentiary. I asked how his mining speculation was getting along, and he begged me not to talk about it.

"I told them," said he, "that I did not know anything about mining; but they shipped me out there, and told me to manage the craft the best way I could, and they knew I would get along all right. When I got there, a shaft had been made twenty or thirty feet down, and the mill was nearly completed. I was determined not to let on to the men there that I did not know all about the business, and when the man in charge of the works came to me, I told him to go ahead, — that he was doing everything all right. I hurried the mill up, and, as it was approaching completion, I went to the mouth of the shaft, looked at several heaps of rocks, pointed out one, and told them to crush that first. I saw the fellows sticking their quids in their larboard jaws, and supposed that it indicated that I knew what I was about.

"We went to work, and run the mill for a week, and the foreman asked me if he had not better clean up. I told him I did not think the mill looked very dirty, and guessed I would not clean up for a while. Fact is, I did not know what cleaning up meant. I visited a neighboring mine, got acquainted with the superintendent, who knew just about as much of the business as I did, and precious little more; but from him I found out what it was to 'clean up.'

"I thought I would let the mill run another week, and so I did. Then we cleaned up, and there was not a particle of gold to be found. I told the foreman he had not arranged things properly; that the quicksilver ought to be on the other side of the riffle, so as to catch the gold when it fell over. I bought blankets, and sheep-skins, and everything else, but could not accomplish anything.

"I used to go down in the mine occasionally, and somehow, every time I went there, there was always an accident — not a serious one, to be sure; but they would dump me out of the bucket, or run against me, or turn a hose on me by accident, or do something. I was getting into trouble every day, but

it never happened in such a way that I could accuse anybody. The country was not fit for a dog to live in, and I soon got tired of it.

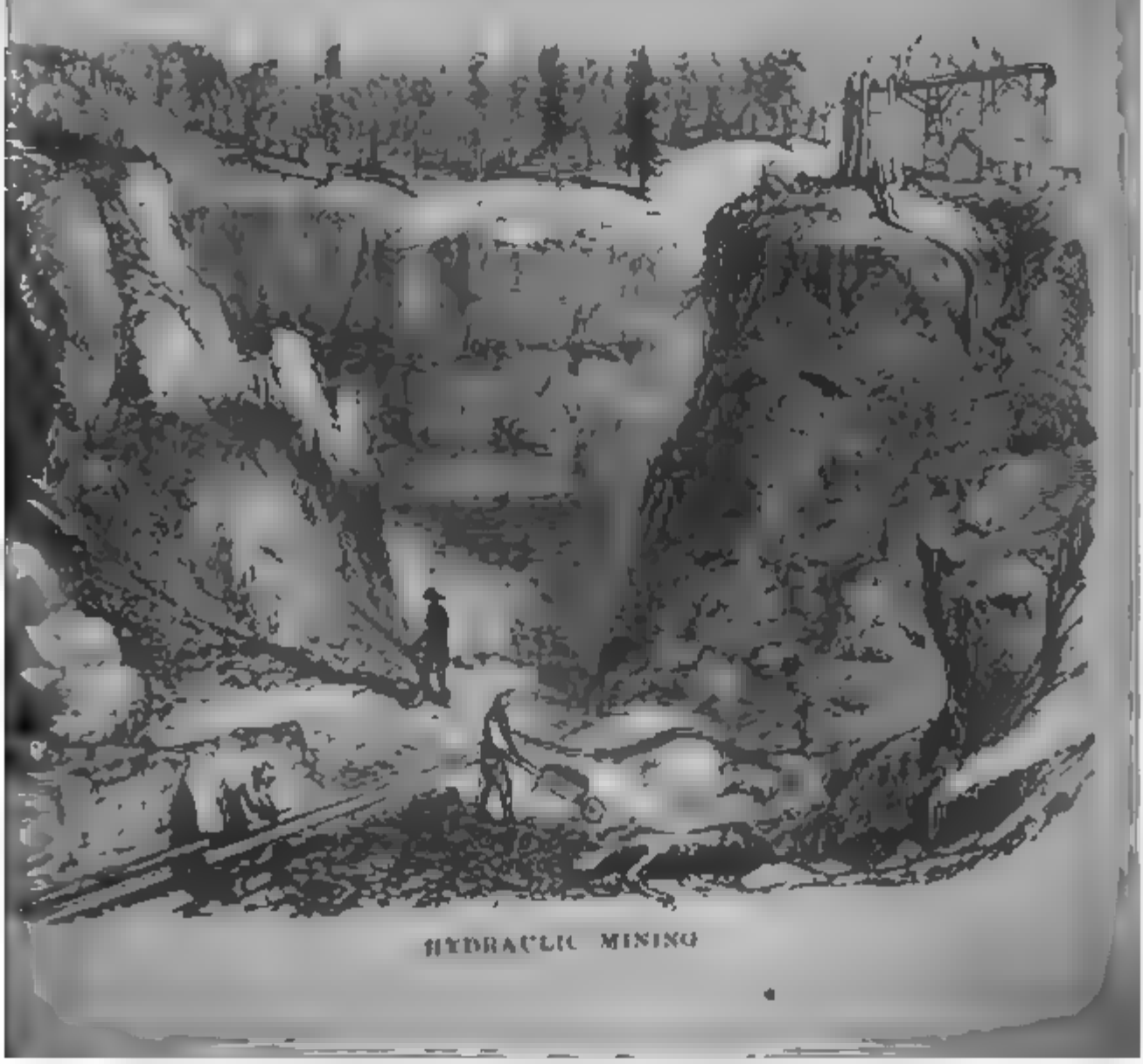
"The company got tired of it too, and I kept writing such discouraging letters, and, besides, the sheriff came on me, and seized everything; so that they finally told me to come home. I left the place suddenly, took the stage coach, and started east.

"I had a back seat in the coach, and right in front of me were two men who were talking about the mines. They spoke of various things that did not interest me much, but finally one of them referred to the Ready Return Mine, which was the one I had been running.

"One of these fellows laughed, and said, 'I wish we had gone to see the Ready Return Mine. Jim Jackson says it is the funniest thing alive. There is a sailor there, superintendent of the mine, who does not know any more about mining than you do about the Ten Commandments. He came out there, pretended to be very wise, and set the boys to crushing wall rock — nothing but the meanest wall rock — with not an ounce of gold in a thousand tons of it. Well, they let him keep on, as there was not any gold there any way; and I reckon he has about spent all the company's money, and will have to bust pretty soon. They have a good deal of fun with him, and play all sorts of tricks on him. I wish we had gone there, and seen the fellow. When the mine busts completely, they are going to lower him down the shaft, under some pretext, then haul up the bucket, and let him stay a day or two, to teach him something about mining.'

"When I heard this," said my aquatic friend, "I made up my mind that I had had enough of that business; and then I knew how those fellows had been gagging me. You won't catch me at a gold mine again."

GROUND SLUICING.



HYDRAULIC MINING

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LVII.

COPPER AND COPPER MINES.

ANTIQUITY OF COPPER. — USE OF IT AMONG THE ANCIENTS. — OLDEST COINS. — THE COLOSSUS OF RHODES. — COPPER MINES OF ENGLAND AND OTHER COUNTRIES. — NATIVE COPPER. — HOW IT IS WORKED. — OVERTHROWING A MASS. — A LUMP WEIGHING EIGHT HUNDRED TONS. — MALACHITE.

One of the first metals known to man was copper. It is related in Scripture that Tubal Cain was "an instructor of every artificer in brass and in iron." In the book of Job we read that "copper is molten out of the stone." It is recorded in Egyptian history that the Emperor Cheops worked a copper mine in Sinai. The ancient Egyptians were familiar with copper, and the Syrians, Phœnicians, and also the Greeks and Romans, used a great deal of it in the manufacture of monuments and statues of bronze. The Colossus of Rhodes, after lying in the sand for nine hundred years, is said to have required nearly a thousand camels to convey its pieces away. The ancients seem to have worked copper mines very extensively, and their facilities for making large castings were quite equal to those of modern times.

Copper was known in America to the races that inhabited this continent before the Indians had any knowledge of it, as appears from the various utensils of copper found in the ancient mounds of the Western country and the extensive mining works along the shores of Lake Superior. The Mexicans and Peruvians had many tools of copper, and it is a curious fact that these tools are almost identical in composition with the tools found at Thebes and other points along the Nile. A chisel found in a silver mine in Peru contained ninety-four per cent. copper, five per cent. tin, and one per cent. iron.

Copper was used for money at a very early period. Some coins are in existence supposed to be twenty-five hundred years old. They contain from sixty to seventy-five per cent. of copper, and the residue is made up of tin, lead, and zinc.

The mines which supply the copper of commerce are situated in almost all parts of the world. Many of them are worked by English companies, and made tributary to the great smelting establishments at Swansea, in Wales. It is easier to carry ores to the localities where coal is mined, than it is to carry the coal to the copper mines. The great value of many copper ores admits of their transportation from the interior of countries to the sea-coast, and their shipment thence by sea to the place where they can be reduced with the greatest economy.

In America there are many smelting works on various parts of the coast, and at some interior points, but none of them are as extensive as the English ones.

Many copper mines are worked on the Andes, particularly in Chili and Peru. Central America and Mexico contain many mines, some of them of great value. Copper deposits are scattered throughout the United States, all the way from New England to California, though comparatively few of them are valuable. There are copper mines of great value and world-wide celebrity in Cornwall, England. Other parts of the British Isles produce this metal. There are valuable copper mines in Germany, Sweden, and Norway, and the mines of the Ural Mountains of Russia are among the richest on the globe. In 1830 the copper production of Great Britain was more than half the entire copper production of the world. Copper mining in other parts of the world was not extensively prosecuted; but subsequently the industry increased so rapidly that twenty-five years later the amount of copper produced in Great Britain, though not less in quantity, was only one fourth of that of the entire globe.

Occasionally circumstances give a great impetus to copper mining. For instance, in 1866, the war between Chili and Spain cut off the copper supply from the former country, and

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gave a great impetus to copper mining elsewhere. In California several copper mines were opened, and were making an enormous profit for their owners, when suddenly the war between Spain and Chili came to an end, the Chilian mines were opened again, and the copper mines of California diminished greatly in value.

Copper is found in various forms; sometimes in sulphurets or oxides, and crystallized in various ways. In some parts of the world it is found in a pure state.

Copper mines are very much like other mines, and do not require a special description. They may be tersely set down as holes in the ground; and one hole in the ground, so far as light and darkness go, is very much like another. I remember that on one occasion, while travelling in a distant part of the world, I endeavored to urge a friend to accompany me to visit a curious cave. He shook his head doubtfully, and said, "O, it's nothing but a hole in the ground; what's the use of going there?" A few days later, I had arranged an excursion into a silver mine, and urged him to join me. He declined, with the remark, "What's the use of going into it? it's nothing but a hole in the ground." Again, when a mining excursion was in progress, he declined to be of the party because the place was in a hole in the ground, and he did not wish to get beneath the surface of the earth until he was dead.

It may be said of a copper mine, as of a coal mine, an iron mine, or anything else of the sort, "it's nothing but a hole in the ground;" but if you should ask, as my friend did, "What's the use of going there?" I think in many instances the owners could point to fine houses and heavy bank accounts, to show you, beyond a doubt, that there is a good deal of use in visiting the mine, or, at all events, in owning it.

Copper mines, some of them at least, are very good things to own, while others are very good to let alone. Many a speculator has come to grief by dabbling in copper stocks, while many another speculator has made a great deal of

money by it. Copper mining is very much like a lottery; there are prizes, and very valuable ones, and there are also a great number of blanks. In Cornwall, the Great Consolidated Mines, as they are called, made a profit in twenty years of three millions of dollars, and their product in one year was half a million dollars. In the next eight years the dividends dwindled down to a very small figure, owing to the expense of working, and for six years afterwards no dividend was declared; then, immediately after, rich deposits were found, and enormous dividends paid. An idea of the extent of these mines may be formed when it is known that the aggregate length of the underground workings is more than seventy miles.

One company in Cornwall paid in five dollars on each share, and its stock consisted of one thousand shares. In the first three months of regular working the amount cleared was seventy-five thousand dollars. In the following year it cleared one hundred thousand dollars. Five years later the dividends amounted to seventeen hundred dollars a share, and each share was worth two thousand dollars. This was a very fair profit on an investment of five dollars.

In another mine the shares originally cost twenty-five dollars each, and a few years later they were worth five thousand one hundred and seventy-five dollars a share.

One copper mine in Australia was opened in 1845. The whole amount of capital paid in was sixty thousand dollars, and the dividends up to March, 1850, were nine hundred thousand dollars. None of the dividends were less than fifty per cent. on the capital, and some were at the rate of two hundred per cent. Half a million dollars remained undivided, so that in five years the total profits amounted to nineteen times the whole amount of capital invested.

The copper region of Lake Superior contains almost the only mines that produce this metal profitably worked in the United States. The existence of masses of native copper had been known for a long time, but nothing was done towards mining in that region until the Indian title was extinguished.

in 1842. Immediately after this the country was rapidly taken up by adventurers from the Eastern States, and mining operations were begun. The state geologist, Dr. Houghton, had examined the country, and located the productive region on the range of the Trap Hills commencing on the south coast of Keweenaw Point. From Keweenaw Point the Trap Hills run in two or three parallel ranges, extending westward more than one hundred miles. There are other trap formations presenting some mineral indications, but most of the profitable mines are in this narrow belt. A great many mines have been opened, but comparatively few of them have been found profitable.

Copper ores are found in various conditions, but there are no mines in the world where there is so much of it in the native state as in the Lake Superior region. The largest masses stand upon their edges in the vein. Sometimes they are many yards in length and several feet in breadth, and their thickness varies from an inch to more than a yard. Silver is associated with copper, sometimes in occasional lumps unattached to the copper, though generally the two metals are in contact, as if the silver had been deposited with the copper, without forming an alloy with it. I believe no alloy of the two metals is ever found there, and consequently they can never have been in a fused condition in contact. The lumps of silver vary in weight from a few grains to several pounds.

Masses of copper of great size have been found. One was discovered several years ago containing at least five hundred tons, and other masses are said to have contained more than eight hundred tons.

The work of cutting out one of these masses sometimes occupies several weeks or months. The mass fills the entire vein, so that the rock must be removed on one side; the mass is thus left as a wall, its upper edge extending into the roof and its lower edge into the floor. When the side is laid bare, the mass is attacked at one end by introducing charges of powder, and as fast as room is obtained, and cracks are

opened between the copper and
charges is increased. The usual f
circumstances is by what is knowi

Powder is poured loosely into th
ties, and is then covered with d
means of a safety fuse, which giv
The first blast will be in a small
are enlarged more powder is intro
eral hundred pounds are spread
once. In several instances one t
have been burned at a single b
been thrown down in this way, th
it can be removed begins.

Two miners strike in turn upon
a third, and thus gradually cut a
This work is repeated until the
sometimes it requires an entire
The mass is reduced into piece
each, which can be hoisted up th
cut into little morsels weighing
tons each, so that it can be easily

To give an idea of the extent o
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The copper mines of Lake S
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DRILLING IN A COPPER MINE

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A very valuable substance found in copper mines is that known as malachite. Specimens of it are found in the Lake Superior district, in Australia, and sometimes in England. The greatest quantities of it — in fact the only quantities of any importance in the whole world — are in the Ural Mountains, in Russia. In the mine of Tagilsk, a pretty town of twenty-five thousand inhabitants, situated in the Ural Mountains, there is a valuable copper mine which produces immense quantities of malachite.

Malachite is a protocarbonate of copper, and by analysis yields seventy-one per cent. of protoxide of copper. It is distinguished for its beautiful green color, variegated in many ways, its fine texture, and its ability to receive high polish. It is used for jewelry, and is converted into tables, vases, and many articles of great beauty.

In the mine of Tagilsk, about thirty years ago, an enormous mass of malachite was discovered, and several years were required to remove it. If it could have been taken out in its natural state, it would have been the greatest curiosity of the known world. The whole weight of this mass was estimated at seven hundred and twenty thousand pounds. Sir Roderick Murchison examined this mass before it was touched by the wedge or hammer, and his description is quite interesting. He says, —

"The copper ground that we have been describing having been excavated by shafts, an enormous mass of malachite was detected at the depth of two hundred and eighty feet. These strings of green copper ore occurring at intervals were followed downward, when, increasing with width and value, they were found to terminate at the base of the present mine in an immense irregularly shaped mass of solid malachite. When we examined this mass, much of the surrounding matrix had been removed, and it presented an appearance of having been cast in a depression of the stone. We are disposed to view it as having resulted from copper solutions emanating from all the porous, loose, surrounding mass, and which, trickling through it to the lowest cavity in the sub-

LVIII.

THE CATACOMBS OF ROME.

THEIR AGE AND EXTENT. — THE SEVEN HILLS HONEYCOMBED. — HOW THE CATACOMBS WERE MADE. — THEIR USES. — THE CHRISTIAN MARTYRS. — IMMENSE BURIAL VAULTS. — MILLIONS OF PERSONS BURIED. — RESORTS OF ROBBERS. — STRANGE ADVENTURES. — VISITING THE CHURCH OF THE CAPUCHINS. — FANCY OF AN IRREVERENT AMERICAN. — DOWN THE CATACOMBS. — STORY OF THE GUIDE. — STRANGE EXPERIENCE OF TWO AMERICANS.

MANY cities of the old world can boast of catacombs. Those of Paris are famous in their way for the large number of skeletons which have been deposited in them. The catacombs in and near other cities have the same peculiarity, and the walls are frescoed and festooned with bones which are placed so as to form fantastic shapes, reflecting much credit upon the persons who arranged them.

The catacombs of Rome are quite interesting, partly from their character and partly from the associations connected with them. Many of them are of great antiquity, and can be traced back nearly to the time when the city was founded. The rock on which Rome is built was of volcanic origin. It is a soft, yellow stone, generally known as *tufa*, and can be quarried very easily. The workmen shaped their shafts pretty much as they pleased, the stone in many places being so soft that it could be cut with an axe. Some of them are more ancient even than the city which Romulus and Remus founded, and they are so extensive that the original seven hills on which Rome stands were perforated and honeycombed by enormous passages and galleries, in which one might easily be lost. As the building of the city progressed, the quarries were extended, some of them several miles away from the banks of the Tiber. During the time of the pros-

tianity, and it is supposed that they greatly aided their fellow-Christians in finding secure places of retreat.

Very little attention was paid to the catacombs until nearly fourteen hundred years after the beginning of the Christian era. By that time the catacombs had ceased to be the abode of Christians, as it was no longer necessary for them to conceal themselves. Outlaws and assassins were gathered in large numbers in the catacombs, and it required very vigorous efforts on the part of the authorities to drive them out. The entrances to many of these places were closed altogether, and have remained closed ever since, so that there are numerous under-passages below and around the city of Rome which have not been visited for thousands of years, and their locality even is not known.

In 1535 the pope ordered some of the catacombs to be explored, and directed that they should be cleared and lighted. A great interest was awakened in subterranean Rome, and Father Bosio devoted about thirty years of his life to the exploration of the catacombs. He opened the way into some of the places which had been blocked up and closed for centuries, and he made drawings and descriptions of some of the most remarkable sculptures, paintings, monuments, and other things which he found there. Several books have been published concerning the catacombs, and anything like a full description of them would require thousands of pages.

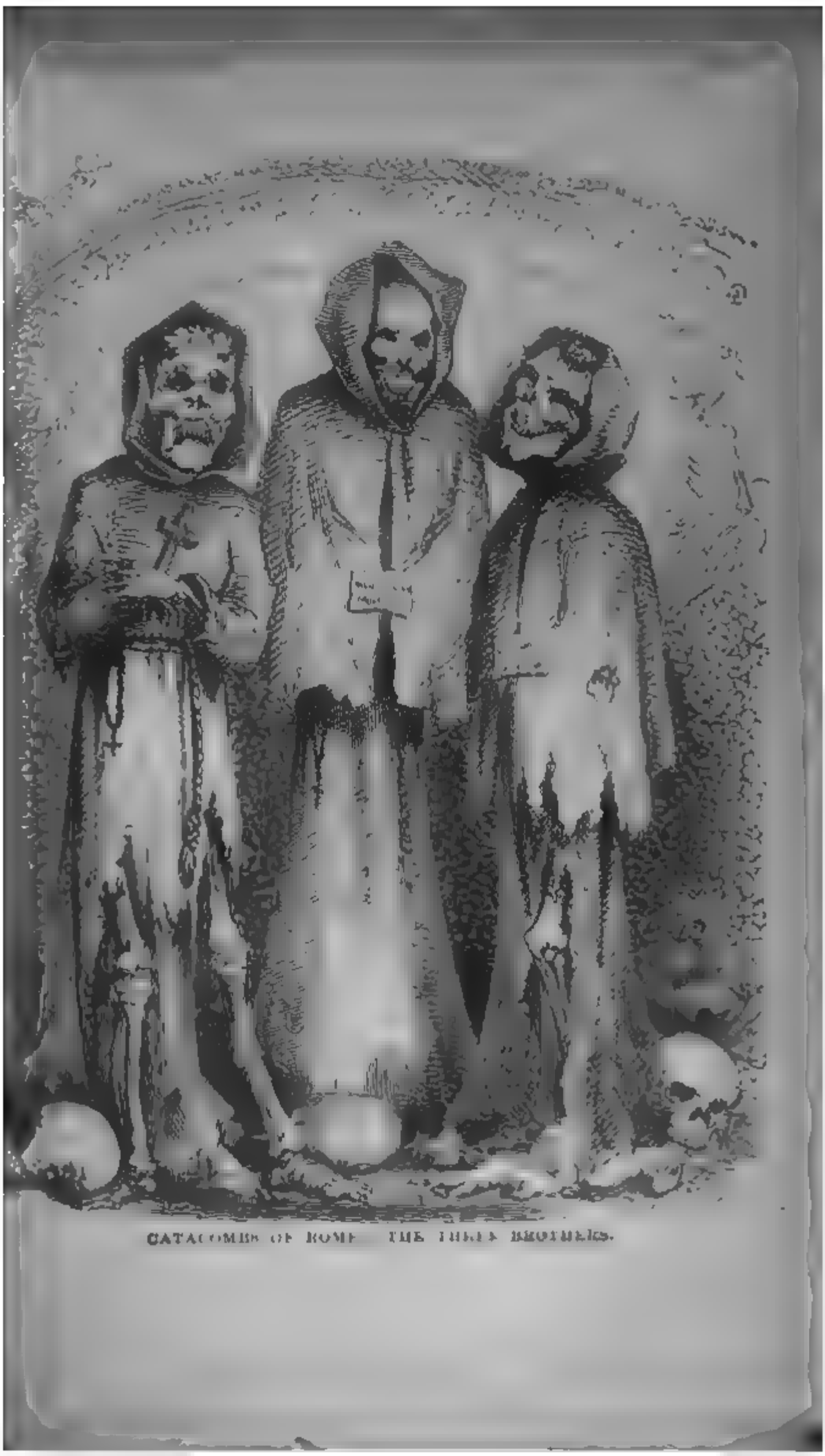
During some of the explorations many valuable articles were carried away, until it was found that there was danger of the catacombs being entirely despoiled. Pope Clement VIII. took the catacombs under his especial protection, and forbade any one to enter or leave them without permission, or take away any article whatever, under penalty of excommunication. Since that time the catacombs have been regarded with great veneration as being the hiding-place of the early Christians, who adhered to their religious convictions through years of the severest persecution.

Every visitor to Rome makes, or is expected to make, a journey through the catacombs. Very soon after my arrival

in the Eternal City I started to make this tour. Our party went first, as a preparation for visiting the catacombs, to one of the churches (the Church of the Capuchins), which is in charge of about twenty-four monks. Underneath the church is the place where the monks after their death are buried. The earth in which they are placed came originally from Jerusalem, and the monks consider it a great honor to be planted there. This number of monks — not the same ones, by any means — have been in charge of the church for several centuries. Whenever any of them dies, he is buried with a good deal of ceremony; and, in order to find a place for him, the bones of one of his predecessors are dug up. The space is sufficiently large for burying forty or fifty persons, so that when one of the number has been placed under ground he is not likely to be disturbed for ten or twenty years. His bones, when removed from the earth, are placed with those of his predecessors. They are not piled up in heaps, as one might naturally suppose, but are fastened to the walls and ceilings of the little rooms that cover the cemetery.

Some of the walls are entirely covered with these bones. As you look at the walls a little distance away, you would think they were frescoed; but a near approach shows you that, instead of being fresco, it is alto-relievo. For example, one wall will have in its centre a skull, and around it will be a select assortment of the bones of the forearm. Then sections of the back-bone, fragments of fingers, toes, and all the bones familiar to the student of anatomy, will be arranged in artistic order, so that the wall forms an interesting picture. Sometimes the bones are arranged in the shape of wheels, and some of them are formed into wheels and stars.

One of the peculiar things connected with the visit to this spot is, that you are shown through the place by one of the monks, who stands complacently by, calling your attention to the bones of his predecessor, and regarding with calm satisfaction the prominent positions which they occupy. He knows very well that one of these days he will go into the



CATACOMBS OF ROME—THE THREE BROTHERS.

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earth which his lantern illuminates, and a few years later his bones will form a part of the mural ornaments. He contemplates death with satisfaction, as he knows he will be buried in a conspicuous resting-place, where people can call upon and admire him. The monk that guided us through the burial-ground was enthusiastic rather than otherwise, and seemed to look forward with delight to the time when he should form a part of an alto-relievo.

An irreverent member of our party proposed asking the monk if he did not think there would be a good deal of confusion at the day of judgment, when Gabriel's trumpet sounds, and the bones undertake to sort themselves out and get together. He suggested that the arms, and legs, and fingers, and toes, and back-bone joints would be a good deal mixed up, and that fragments of a dozen monks might be collected together and present themselves as one individual. He said the head of Brother Ignatius, the body of Brother Francis, and the arm of Brother Peter might be mixed up with the legs of Brother Simon, and an arm, or leg, or a rib of somebody else. We reproved him soundly for his levity, and told him he had better go.

Some of the catacombs are entered beneath the churches, while others are entered in the open ground. The first one we went to after leaving the church was at the right of the Appian Way, a little distance outside the city. There was a party inside when we reached there, and the guide who took us in charge said that the rules forbade two parties going down at the same time, and that we could not descend until the other returned; so we loitered around for a little time, until our predecessors came out. We found ourselves in the middle of a field, part of it cultivated and part of it in rich, luxuriant grass. To all external appearances the ground beneath was perfectly solid, and we almost began to think we had come to the wrong place.

The guide preceded us to a little hollow or excavation, down which there was a flight of steps. We stood around this until we saw some heads emerge from the ground two

or three hundred yards away; then the guide descended the steps, and we followed him. He unlocked a door and allowed us to enter; then he locked the door after us, and we found ourselves standing in a place where there was very little light, and it was evident that we must have candles before proceeding farther.

He produced the candles, and each of us produced a franc. Another carriage-load had joined us, so that our party consisted of seven or eight persons. The harvest for the guide was a very good one, and certainly allowed him no occasion to complain. When we had lighted our candles he told us to follow him, and we descended another flight of steps, and then struck off through a narrow gallery about six or seven feet high — narrow in some places, and in others enlarged to a width of ten or twenty feet.

As we went along, the guide explained to us the character of the place, its mode of construction, and the uses to which it had been put. He explained that the catacombs were originally quarries; that we were then in the second gallery from the surface, and that there were three similar galleries below us. He could take us through all of them if we wished to go, but the journey would be rather monotonous as the objects to be seen in all were very much alike. This mode of working in galleries one above the other is not peculiar to the Roman catacombs, though it is more noticeable there than in any other locality. Imagine a hotel, half a mile square and five stories high, placed under ground, and you can form a very good idea of the arrangement of this catacomb.

All along the galleries there are little niches, called *loculi*, cut in the sides one above the other, just large enough to contain a single body. From nearly all these *loculi* the skeletons have been removed, but there is now and then a skeleton or so visible, and adding interest to the place. It is said that millions of bodies were buried in these catacombs during the time they were used for cemeteries. Those that have not been explored are still full of skeletons, and would fur-

nish relics enough to equip several thousand new churches. Here and there the guide pointed out small rooms or chambers in the tufa, where some of the Christians lived. There are inscriptions of a religious character scratched upon the walls of many of them, some being legible, while others are only partly so. Beneath many of the *loculi* there are inscriptions showing who are resting there, and at the entrance to one of the chambers, in which a dozen skeletons are leading a very quiet life, there is an elaborate door-plate set in mosaic.

The places where some of those who have since been canonized dwelt in their lifetime and were buried after death, were pointed out. Some of them were quite interesting, and several were ornamented with considerable care. Sometimes there were mosaics and marble monuments of considerable size; and at one spot a life-sized statue cut from the tufa rock, and evincing considerable skill on the part of its designer, was shown to us.

We followed our guide in single file. Some of our party were rather inattentive to his directions. Among them was a pair of lovers, who seemed much more interested in saying sweet things to each other than in looking at the curiosities of the place. Several times they lagged behind, and the rest of us were obliged to halt and wait for them to come up. Their dilatoriness caused the rest of the party at times to become separated, and as they showed a disposition to wander off in the side-galleries and corridors, we were apprehensive of losing some of them. Sure enough, when we reached our journey's end one of our number was missing.

Our guide left us and went back, and he was gone ten or fifteen minutes before he found the missing individual. When he brought him forward and we were united, the latter said that he thought we turned a certain corner while he was examining the grave and bones of an early Christian. He followed and could hear our voices, but was surprised to find that, in following us, he seemed to get no nearer. He thought a minute or two, and then concluded that he was

"Just then I happened to think that I did not count the party when they came out, and quite likely the crowd might have been two men short; so I went and found the custodian of the place, and got permission to go into the catacombs. The rules forbid us to go into the catacombs between sunset and sunrise, unless we have a good reason; and I thought my excuse was good enough at that time. I was afraid that those Americans might be shut up there in the dark, as their candles were not very long, and unless they burned them singly, were not good for more than three hours.

"From the time I shut up the place until I got there again and unlocked the place, it was nearly five hours. The Americans are a strange people, as I found when I went down there.

"I expected to find these men, if I found them at all, half dead with fright, and wandering about or trembling in the darkness: but they were nothing of the sort. When I got down into the place and walked along one of the galleries, I heard somebody singing. He would sing a little while, and then he would whistle. I could hear a rattling of bones and a sound as if somebody was dancing.

"Well, gentlemen, as sure as I am a guide, when I came in sight of those men they were in a place where the gallery widened out into a sort of chamber, and there were some skeletons which had been tied together with wires and thongs. The chamber was about ten feet square, and these skeletons were in the niches in the side. Those fellows were there. One of them was sitting on the edge of a niche, and making music by singing or whistling. He kept time with a couple of leg-bones which he had in his hands. The other was hugging a skeleton as if it had been a queen of the ballet. I stood still five or ten minutes to see what they would do.

"When the fellow that was waltzing got tired, he seated his skeleton in the corner, bowed to it as if it had been a young lady, patted it on the cheek, and sat down. Then the other one got up and picked up the same skeleton; the one

who had just been dancing made the music, and the scene was repeated.

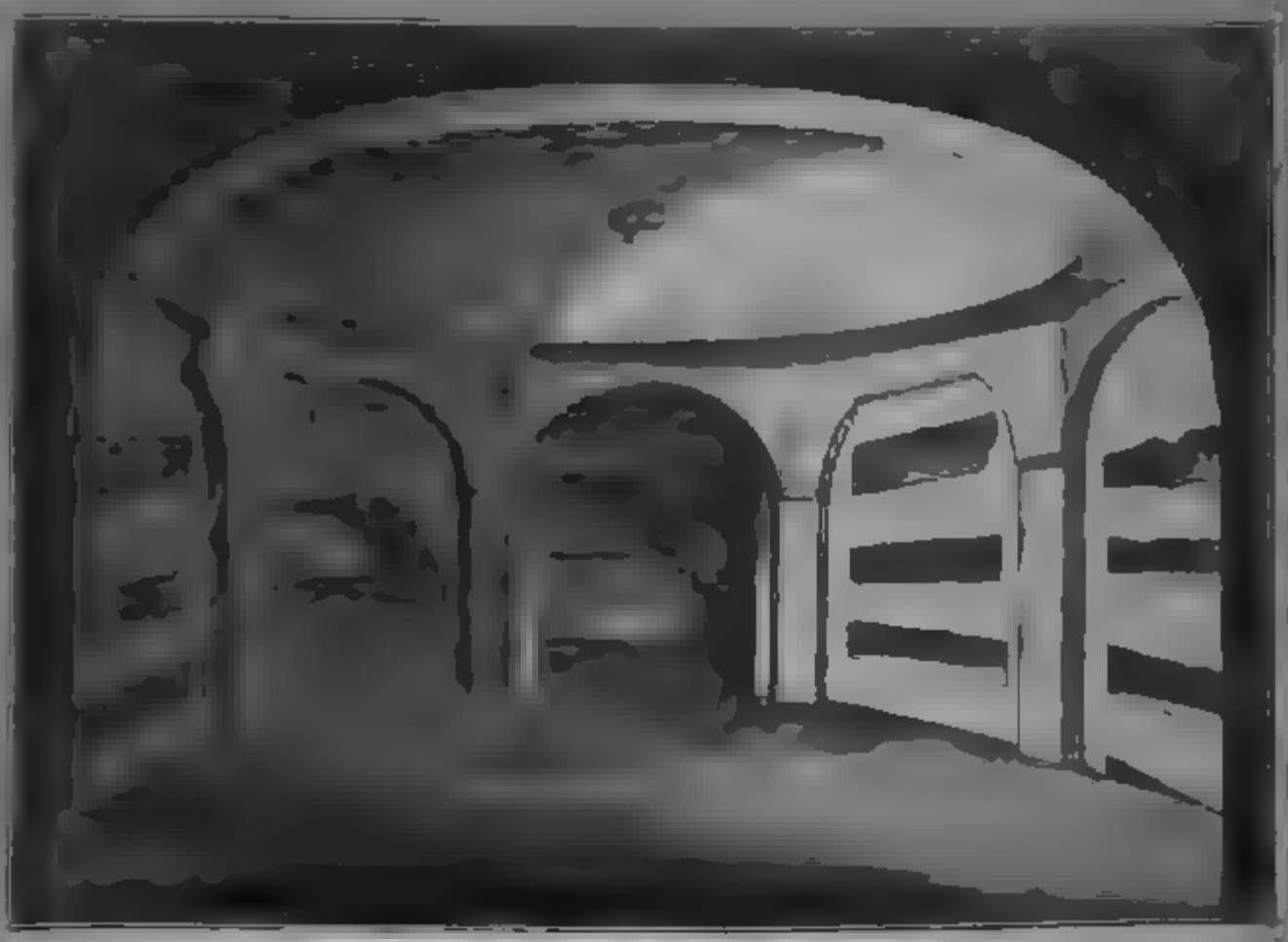
"I shouted to them; they looked a little surprised, and answered me.

"They said their candles were nearly out. As soon as they found that they were lost they concluded they must stay there all night; so they stopped right where they were, entered the chamber, and made themselves as comfortable as possible. The accommodations were not very good, but one of them said, 'Now that we are in for the night, I guess we will stay it out.'

"They gave me some money, sent me out for a couple of bottles of wine and something to eat, and told me to come again in the morning. They sent money enough to pay the driver. I bought a dozen candles, took them their overcoats from the carriage, so that they could use them in case they wanted to lie down on the ground, and they had a merry time of it all night.

"They promised not to disturb anything, and I knew they were gentlemen, and would keep their word. They did not sleep any, but kept carousing all night. They were ready to come out when I went there in the morning; and though they said they had plenty of fun, I don't believe thay would care to stay over night in the catacombs again."

In some of the catacombs many persons of distinction have been buried. The place where the Christian martyrs were concealed has been regarded with such veneration that a great many people have considered it a high honor to be buried there. Sometimes people who had died in France, Spain, and other distant countries, were brought to Rome to find a sepulchre in the catacombs; and sometimes their funeral ceremonies were conducted with great pomp. Among the noted men buried in the catacombs were the Popes Leo I., Gregory the Great, Gregory II. and III., Leo IX.; also the Emperors Honorius, Valentinian, and Otho II. In most of the places now opened to visitors there are no graves of persons of distinction, though there are several of the second and third class.



VAULTED CHAPEL IN THE CATACOMBS.

TOMB IN THE CATACOMBS.

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The place where we emerged from the catacombs was some distance from where we descended into the earth. It was in the same field, and through an excavation which promised as little as the one by which we descended. The light of the Roman sun seemed much brighter than when we left it, and it was some minutes before our eyes were accustomed to its dazzling rays.

They set out on their rounds between nine and ten o'clock in the evening, with a large willow basket strapped to their back, carrying in one hand a stick about a yard long, terminating in a hook, and in the other hand a lantern fastened to a piece of wire, so that they can swing it over the ground, and discover if there be anything they want. They pay particular attention to the little heaps of rubbish, made by the citizens before their doors, from the miscellaneous refuse of the household. After these have been raked by the rag-pickers, they are carried away by the scavengers' carts. The pickers-up of unconsidered trifles never waste any time or space. They understand the exact distance from one point to another, always moving in straight lines, and taking in everything at a glance. Their vision is like that of hawks. They very rarely miss anything, or confound one object with another. They know bone from wood, and coal from glass, though it be half buried in the mire, and transfer every desirable fragment to their basket by means of their hooks with unerring accuracy, and by a single curve movement. It is astonishing how quickly and thoroughly they can hunt through one of the little dirt-piles. After quitting it, it is as valueless as the notes of a western wildcat bank, or a second-hand tombstone.

They never encroach upon each other's domain, for they have their particular districts marked out, and generally visit them unaccompanied, darting about in silence, without the least indirectness, dawdling, or delay. They are certainly among the most industrious and indefatigable of laborers, if not the tidiest and most fastidious. They go forth in all sorts of weather, night after night, month after month, and year after year: patient, plodding, never discouraged while there is the slightest chance of finding a bit of leather or scrap of paper in the entire capital. So dexterous are they by long practice in the use of their hook, that they very seldom employ their fingers.

The night-wandering gypsies have the highest expectations from the gutters, where they are often delighted by securing

a prize that yields them a whole centime, — one fifth of a cent, — and when they discover what will sell for a sou, they deem themselves blessed. There, cigar stumps, remnants of shoes, and broken bottles, are sometimes found, and are enough to cheer the heart of the rag-picker for weeks after fortune has ceased to smile upon his nocturnal gleaning. At long intervals a whole bottle dawns upon his vision, and he is as much rejoiced as an American would be if he should stumble upon a treasure of gold buried in his cellar.

The pleasures of the bottle have a new interpretation with the chiffonniers of Paris. The phrase has a literal, not a figurative meaning with them, and I have heard them speak of finding half a dozen bottles in one week, as Ponce de Leon might have spoken of discovering the fountain of eternal youth.

I remember to have bound one of the guild to me in eternal gratitude by presenting him with a few empty wine bottles, as he passed my lodgings one stormy night. He regarded me as a gentleman of munificent income; he went away, I am persuaded, with a semi-conviction that I owned the Bank of France.

One would hardly think that the poor devils of the hook and basket would attempt to have any comfort in this life. But they do; for they are French, and must have dissipation and distraction, however humble and homely it be. After midnight, they visit the cheap wine-shops, where they can purchase as much wine as they want for two or three sous. They smoke their pipes there, and have very pleasant chats, manifesting a gayety in their rags and dirt that only a Gaul can feel. They even get mildly tipsy sometimes, but usually start off with their baskets before daylight, make another round, and then sell their collection to the rag and refuse merchants who are their regular customers. The contents of their baskets, holding some two bushels, will bring from twenty cents to one dollar in our money, the average rate being from forty to fifty cents.

The merchants have large magazines in the quarters

frequented by the chiffonniers, and employ scores of men and women to assort and arrange their unwholesome purchases. The air of the magazines is vitiated and poisoned by the exhalations from mouldy leather, greasy rags, filthy bones, and repulsive rubbish generally. How those whose duty it is to attend to this obnoxious business escape contagion is by no means clear. It may be they are so defiled and encrusted with dirt themselves, that they cannot receive any harm from what they handle, though if they were neat in habit, or if their pores were open, they could not fail to be made sick unto death by breathing such tainted air. They are advanced in years, or infirm in body, having belonged, most of them, to the rag-picking profession when they were younger, and in sounder health. They prefer the more active, open-air duties, but are forced by circumstances and their condition into this lower grade of offensive industry. For twelve hours of labor a day, they are paid about thirty cents, and on this, in some unaccountable way, they contrive to keep their wretched bodies and souls together.

I ceased to wonder how the rag-pickers lived when I discovered where and under what surroundings they lived. Live indeed? Theirs is a satire upon life. It does not deserve the name of subsistence, or even vegetation, for subsistence and vegetation are at least natural and salutary. Few strangers in Paris ever see such miserable quarters as are the damp, dreary, and ill-ventilated cellars of the Quartier Mouftard, in the neighborhood of the old Barrière des Deux Moulins, in which the chiffonniers reside. In those narrow and dismal streets, reminding me of the streets in the old Spanish towns, the sunshine is shut out, and the fresh breeze of heaven is unknown. In those vile dens, the unfortunate toilers herd together, frequently sleeping ten or twelve in a small apartment, regardless of age or sex, paying three or four sous a night for their detestable lodgings. Some of the aged and less impoverished couples pretend to keep house; but it is after so sorry a fashion that their homes would be unwelcome to a respectable beast.

The majority of the rag-pickers sleep where they can, and take their meals in the dismal cook-shops, eating whatever is given them, and asking no questions. Worthless dogs that have come to tragic ends are there served up for beef, and cats, whose nocturnal serenade has been suddenly brought to a close by the hurling of an unappreciative brick, are placed upon a rude table and labelled as mutton. Customers who work hard, and earn but three or four dollars a week, are not fastidious. Whatever satisfies the cravings of hunger is pronounced good, and where very little is charged, very little must be expected.

I busied myself one day in investigating the quarters of the chiffonniers, because I always feel an interest in the human family in its least favorable conditions; but what I saw did not induce me to repeat the experiment.

One of the cook-shops that I entered had a very remarkable way of feeding its patrons, combining the excitement of chance with practical advantage. The proprietor of the place purchases from the restaurants such scraps and fragments as are left upon the tables and in the kitchen, puts them in a large pot full of water, and submits them to a long boiling. The result, quite a savory soup, is placed on a table, and anybody, by paying two sous, has the privilege of thrusting a long iron fork into the kettle, and of eating whatever he can bring up from the bottom. Sometimes the handler of the fork is rewarded with a very tolerable piece of beef, mutton, chicken, goose-liver, or some genuine delicacy that may have been ordered at a fashionable restaurant in the Boulevards. Even if the fork come up without the hoped-for prize, the adventurer is entitled to a plate of the soup, relished none the less because the eater has had the boldness to risk his sous for something more substantial. This culinary game is called the fortune of the fork (*hasard de la fourchette*). and is much enjoyed by the chiffonniers. I felt a curious interest in it myself, though I lacked the relish of hunger, and consequently the personal sympathy properly belonging to the entertainment.

The rag-pickers gathered about the table on which the large kettle stood, watching with eager eyes the fellow who handled the fork, and made a dash for the invisible morsel he so craved. When he brought up nothing, he showed no disappointment, but laughed with the throng; and when he was lucky enough to lift upon the tines what is called in Paris a *bonne bouche*, they applauded him with hands and voice, as if he had obtained a grand victory. The rude and dingy cook-shop, with the soiled and tattered rag-pickers in the centre, and the burly proprietor in the background, made a picture which Doré would have been pleased to draw.

The soup had an appetizing odor, and I could not doubt that what appealed so much to one sense must be grateful to another. I told my companion, a young New Yorker, that I thought of tasting it; whereupon he offered to bet me the price of a dinner at the Café Anglais that I durst not obey my thought. I called at once for a plate of the *potage*, and really found it excellent, twenty times better than much that I have eaten in first-class hotels at home. The effort of my friend to thwart my humor by talking to me of broiled horse, roast cat, boiled parrot, and stewed puppy, had no effect. I finished the soup with satisfaction, and at the dinner which I had won expressed my regret that the Julienne we had there was not so good as the mysterious mixture in the Quartier Mouffard.

The chiffonniers are reputed to be extremely honest. As evidence of this, they are very seldom arrested for any violation of law, and, according to the French code, the finder of any article of value is considered guilty of larceny unless he makes some effort to restore the property. In a great and luxurious city like Paris, many such articles must necessarily be lost, and they are very likely to fall into the possession of the rag-pickers. The representatives of this order are constantly discovering objects which they must feel a strong temptation to keep. Still, they do not yield to the temptation, but deposit what they find with the commissioner of police, who gives a receipt, and takes the name and address of the finder. The thing found is carried to the Prefecture,

where it is held, with many other articles, for twelve months; and if, during that time, no one claims it, it is returned to the finder on the presentation of the receipt. In no other city can you feel half so certain of regaining what you have mislaid, or left, or dropped in some public place. I have known of watches and pocket-books (with something in them, too) restored, time and again. I have even recovered lost umbrellas, without the least trouble, and have been handed small pieces of money which I had left upon the tables of restaurants, several days after I had dined there.

Every week a list of articles found and deposited at the Prefecture of Police is published in the official journal, some of which, one would imagine, could not be very readily lost. Among the articles the most frequent are bank notes, porte-monnaies, watches, jewelry, rings of keys, lorgnettes, canes, shawls, gloves, &c. But it is newhat singular to note, as I have noted, in the list, casks of wine, barrels of brandy, sets of false teeth, wigs, baskets of newly-washed linen, petticoats, hats, and even babies, who have been accidentally left in omnibuses, railway cars, or the public parks, by absent-minded nurses or self-absorbed mothers.

The great majority of the rag-pickers are, as would necessarily be inferred, ignorant, and of the humblest origin. Some of them, however, are persons of education, who have fallen from their natural position through defect of their own, or adversity of circumstances.

I recollect a rag-picker — he must have been nearly fifty years of age — who passed nightly along the Grands Boulevards, and who, when not surveying the ground with his lantern, walked erect, and with military precision. I was told that he had been well born, was of an old and influential family, and had served with distinction in the army in Algiers. Cashiered for some irregular conduct, his family disowned him, and he began a course of dissipation, which soon left him without friends, money, or self-respect. He came to this country in the hope of being able to reform; but his habits of intemperance adhered to him, and after numerous disreputa-

ble experiences, and after several arrests on charges of stealing, he returned to Paris.

He could get no employment there of the kind he wanted, and after trying divers methods of obtaining a livelihood, he settled down, socially and mentally, into a rag-picker. Oddly enough, in this position he became industrious and moderately abstemious. Two years ago he was accounted one of the most energetic of his tribe, and often earned, with his lantern and his rake, fifty or sixty francs a week, which is much above the average. Having reached the lowest level, he seemed quite satisfied; and they who had talked with him said he never murmured at fortune, and very rarely referred to his antecedents. His health and strength were so well preserved, that he had continued in his grubbing occupation twelve or fifteen years longer than is customary with his class. This appears to be one of the few instances in which as men descend socially they rise morally.

Among the trilleuses, — the old women who arrange and assort the contents of the chiffonniers' baskets for the rag-merchants, — I recall, just before the Franco-German war, one of the ugliest hags it has ever been my fortune to see; and my observation of hags has been extensive, varied, and profound. One of Rembrandt's ancient females was youthful and beautiful to her, who attracted me, somewhat after an inverted fashion, by her positive hideousness. Seeing her one day in the Cité Doré, I inquired of a gendarme respecting her. He expressed his surprise that I did not recognize her, adding, "Everybody knows her. She is called the Belle of the Bottomless Pit (*Belle d'Enfer*)." He then gave me her history; and thus it ran: —

She was nearly seventy; forty years before, had been one of the handsomest and most courted of the lorettes of Paris. Everybody admired her lovely face and exquisite figure. Her fame as a beauty had extended to all the capitals of Europe. She had any number of wealthy lovers, and not a few young noblemen of high rank in her train. She lived like a queen. Her horses, and carriages, and toilets were

the envy of the most fashionable ladies; and when th
of Annette Gariteau was mentioned, as it constantl
eulogies on her charms were upon every lip.

On retiring one night, her bed-curtains caught fire, t
was dreadfully burned. Not a single trace of her beau
left, but in its stead a frightfully disfigured face, and
elled and crippled form. For some weeks it was thou
could not live; and when she did recover, she was
gusted with herself, she tried to commit suicide by dro
by poison, and by charcoal. They all failed, and sh
fancied it was the wish of Heaven she should atone
past errors by living until nature summoned her. Sin
she has been very pious, never neglecting her religious
in the smallest particular. She became a rag-picker b
she considered that the humblest of callings, and becau
thought that in it she would best serve her purpose o
tence, and render her reformation clear as noonday
eyes of all who had known her in her pride of iniquity.

That was a queer story, and would hardly have been
sible, or probable, except when told of a French wom
heard it repeated several times afterwards, and have
son to doubt its correctness. The tale made a deep impr
on me; and now, whenever I see some deformed and mis
creature, I try to forget her deformity and misery by
ing that she may be another Annette Gariteau.

XL.

BRIGANDAGE AND PIRACY.

RELATIONS OF THE STEAM ENGINE TO HONESTY. — PIRACY AND STEAMSHIPS. — HOW THE SLAVE TRADE WAS BROKEN UP. — STORIES OF BRIGANDS. — EXPLOITS OF SPANISH ROBBERS. — "ROAD AGENTS" IN CALIFORNIA. — AN ADVENTURE WITH HIGHWAYMEN. — AN ARMED STAGE COACH. — THE HAUNTS OF THE ROBBERS. — STORY OF A PLUNDERED PASSENGER. — "PUT UP YOUR HANDS." — AN EXCITING INCIDENT. — BROAD-HORNS AND KEEL-BOATS. — MIKE FINK AND THE CLERGYMAN. — PIRACY ON THE MISSISSIPPI. — A FIGHT WITH RIVER PIRATES. — A CAPTAIN AND CREW MURDERED. — VISIT TO A ROBBERS' CAVE.

THE invention of the steam engine, while it has done a good deal for honest labor and honest enterprise, has done just as much towards breaking up dishonest enterprises and occupations. Before steamships came into fashion, the broad ocean and its adjacent waters were in many places the cruising grounds of pirates. They had sailing vessels built very long and low, with large spars, and, in proportion to the size of their hulk, with an immense spread of canvas. In a light wind or a heavy breeze, they could outsail the deeply and richly laden merchant ships, whose breadth of beam was great in proportion to their length, in order that they might carry heavy cargoes. These pirate vessels either sailed on the open ocean, in the track of merchant ships, or were concealed along the coast, whence they could dart out, and, after securing their prey, could sail back to their safe retreats. It was impossible to avoid them, impossible to escape them in a fair race, and, from the great number of men they carried, generally impossible to contend against them. Ships of war, like merchant ships, depended upon the wind for their propulsion, and were rarely able to sail as rapidly as the pirate craft. The invention of the steam engine was followed by the construc-

tion of the steamship; and when the steamship was with guns, she could run down and destroy these cruisers.

Piracy in the West Indies and other regions, as wel the open sea, came to an end when steamers were b into general use as ships of war. At the present day, prevails only in those portions of the far east whe steamer is in comparatively little use.

The slave trade received its death blow within th twenty years, when England and the United States other nations interested in its suppression, substitute steamers for sailing ships along the coast of Africa. the ports of the west coast of Africa, where the slave were laden, it was comparatively easy to escape under of a dark night; and, once fairly at sea, the slavers co defiance to their pursuers. With the wind, all had th chance, and the slavers were generally so construct equipped as to be able to outsail their pursuers; but came otherwise when the latter availed themselves of s

On land, in past times, brigandage flourished, an profitable until the railway came into general use. A coach or a carriage with a private traveller, on a lonely might be robbed with comparative ease; but when the coach or the private carriage was exchanged for the r train, robbery was not so easy. Enterprising briga Spain and other countries occasionally try their hands bing railway trains, but such exploits are rare. Saf every way, whether against accidents or human mal rendered much greater by the use of steam. At the p day the countries most affected with brigandage are where railways are comparatively scarce. Until with past few years, California had no railway lines, and sh the most profitable field in all the United States for t ploits of robbers. Californians facetiously call highwa "road agents," and I have heard sometimes that the C nians are proud of their existence.

I remember some years ago taking a stage coach i

Golden State over a route infested with robbers. I had heard vague rumors of exciting scenes along the road, and we had no great objection to a small encounter with these artists of the revolver. As we started from the station near the infested region, the agents of the stage company furnished every man with a rifle, and told us to keep a sharp lookout for the road agents. About half of us were accustomed to fire-arms, but the other half evidently knew as much about the handling of a rifle as a horse knows about geometrical surveying. I was fearful at starting that, if we came to a fight, the accidents among us by the careless handling of our rifles would have caused more mortality and inflicted more wounds than the fire-arms of the robbers.

There were several points on the road where the robbers were looked for, and when we approached one of them, the driver would call our attention to the fact. Then everybody would move about in his seat, and straighten himself like a rooster ready for crowing; and some of the more timid ones would start as though they had suddenly dropped upon a chestnut bur. Our rifles were held in all sorts of ways, and with the barrels sticking out in different directions, the coach bore a faint resemblance to an enormous porcupine. Each of the dangerous places we passed without accident, and at the next station we left our rifles, and were thankful that the great peril was over.

I afterwards learned that the robbers had fully determined to attack us that day, but one of the party had gone on a drunk, and deranged their plan. Before that time I had regretted the habit of intemperance among the Californians, but when I heard of this occurrence, I was thankful that the principles of Father Mathew did not prevail among them. With all due regard to John B. Gough and the cause he has advocated, I have no objection to every robber in the world getting blind drunk every morning, and remaining so for forty-eight hours at least.

Robberies on that route were of quite frequent occurrence. Since that time the railway has taken the place of the stage

ing a bullet through me, and I put them up at once. They stood us up in a row, with each fellow sticking his hands up in the air, like a class of school-boys ready to answer questions. Then, when they got us all out, two of them stood guard, and a third went through us. He went through us first for our pistols, and took every one, and laid them in a pile on the ground, right between the two robbers, and in such a way that we could not get at them without being shot.

"They then went through us for watches and money, and they made a very good haul. I did not have much — only just enough for my expenses; and when I told them so, and they saw it, they told me I had better keep it.

"There was one passenger, though, who had twelve hundred dollars in coin. They took the whole lot, but generously gave him twenty dollars to pay his expenses. 'Nothing mean about us,' said one of the robbers, as he handed back the twenty-dollar gold piece. 'We don't want to be rough with any of you, but we must make our living.'

"When they had cleaned us out, they let us go back into the stage. They told us to keep still, or the first man that moved would get his head shot off. One of the fellows stood by the door of the coach, to see that we obeyed orders. He was not going to have any fluking.

"Then they made the driver and express messenger hand down the express box. The box was heavy, as it had a considerable amount of money in it. The messenger was reluctant to give up the money, but they finally persuaded him to do so, by cocking a pistol so as he could hear it, and putting the muzzle of it into his ear. The driver was obliged to sit still, with his reins down and his hands up. The whole operation did not take ten minutes, and when we were through, and ready to start, we were a comical picture. All of us inside were holding up our hands; the messenger had his hands up in the air, and the driver was holding one hand in the air, and taking the reins in the other from one of the robbers. The fellows stood there, with their pistols ready to shoot, and told us to go ahead; and you bet we did go ahead."

In the early days of navigation on the Mississippi tributaries, before the construction of steamboats, th a great deal of piracy. Before the steamboat was in the navigation of the great river was conducted wi and keel-boats. The raft was built on the upper freighted with produce, and floated down to New where both the raft and its cargo were sold. It float the current. It would descend, but it could not be ascend. The keel-boat was of better construction, a floating down the river with its cargo, it was loade cend it.

A long time was required for this upward voyag current of the Mississippi is very strong, running i places four or five miles an hour. Sails are of very lit as the river is crooked, and the wind is rarely strong keel-boats were propelled in two ways — first, by "poles;" and, secondly, by "cordelling." In propul means of setting-poles, long poles are used, and set temporarily in the bed of the river. There is a pl which men can walk along the edge of the boat. T with his setting-pole goes to the bow of the boat, fi pole, and then walks slowly aft. In this way the moved under his feet, and propelled up stream.

Cordelling is a system of towing. The men walk al banks of the river, and tow the boat by main strength the stream.

The advantages of steam over this old process of pro may be well illustrated upon the Ohio River, between nati and Louisville. The distance is about one hundr fifty miles. In 1794 keel-boats made regular trips b the two cities, carrying freight and passengers. F round trip they required four weeks. A steamboa leaves Cincinnati at noon, and lands its passengers in ville the next morning. By noon she is ready to again, and makes the round trip, with plenty of time in every two days.

The boatmen of the Mississippi in the olden time w

peculiar class. Rough, hardy, uncouth fellows they were; ready at any time for an adventure, generally delighting in a fight, and able to perform a great deal of hard work. They were prompt at fairs, races, and all other assemblages along the river banks; and when they landed in a town, and concluded to clean it out, they generally did so. The inhabitants being powerless, the boatmen had it all their own way.

The West is full of stories about these boatmen and their peculiar lives. One of the most famous of the class was Mike Fink, whose history has been made the theme of a popular story. A story is told of a clergyman from the east travelling down the Ohio River, some years ago, who was anxious to learn something about Mike Fink. Somebody told him that the pilot of the boat on which he was travelling had been acquainted with Mike. The clergyman approached him, and said,—

"Do you know anything about Mike Fink?"

"Yes," said the pilot; "knew him like a brother."

"Can you tell me some peculiar incident of his life?" asked the clergyman.

"Well, I don't know," replied the pilot, hesitatingly. "Yes, I can. He ate a buffalo robe once."

"Ate a buffalo robe!" said the clergyman, astonished.

"Certainly, a buffalo robe, with the hair on," replied the pilot.

"Well, what did he do that for?"

"Why, you see," said the pilot, resting a moment, to shift his quid of tobacco, "you see, Mike drank so much whiskey that he destroyed the coating of his stomach, and the doctor told him that before he could get well, he would need a new coat for it. Mike thought the thing over, and said, when he had a new coat for his stomach, he would have one that would stand the whiskey; and he made up his mind that a buffalo robe with the hair on it was just the thing, and so he sat down, and swallowed it. He could drink any amount of whiskey after that, and never so much as wink. Fact, now, as true as you are standing here."

The clergyman turned away, satisfied.

Besides such adventures as fighting with each oth with the inhabitants along the river, these men had c with robbers. There were many gangs of robbers along the Ohio and Mississippi Rivers, and they had of resort known only to themselves. Some of the lim cliffs abound in caves, and here the robbers genera their concealment. They watched for the boats asc and descending the river, sometimes fired upon ther the bank, and sometimes came out in skiffs to capture Many a boat, while quietly anchored for the night, ha been attacked, and its crew murdered, and thrown i river. The boat would then be drawn to the spot mo venient for the robbers, plundered of its contents, and fire; or it might be manned by a portion of the gang to New Orleans, and sold.

Such an occurrence was not unfrequent, as a rapid p down the river would enable them to sell the boat, and again to their place of concealment, before the officers law could go in pursuit.

There are many interesting stories in the robber his the great valley. One was told to me, some years ago old steamboat-man, who had worked in his younger d board of keel-boats and "broad-horns," as the flat-boat generally termed, and are now to the present day. the story, as nearly as I can remember it, in his own w

"There used to be a famous place for robbers on the part of the Ohio, down below Paducah. Many a boat ha captured there, and the men on board of it were never of afterwards. They were a desperate lot of fellows. robbers did not mind killing a man any more than you mind killing a rat. I shipped on board a broad-horn from Louisville, going to New Orleans. We had a lo pork and corn, and the captain of the broad-horn owned half the boat and her cargo. We got along very well w any trouble until we got down to the place where these r were, and just there we ran on a sand-bar. It was a ti

place. There we were stuck; the river was falling, and if it left us on the bar, we would have to stay there until the next rise — that is, if we did not die in the mean time. We worked away all the afternoon, and all night, but to no purpose. One after another, we had dropped off, and gone to sleep.

"We were about a quarter of a mile from the shore, but the current was not very strong. Towards morning, when I was on watch, I heard some men on shore. A little while afterwards, I heard the sound of oars, and saw a boat coming out of a little creek just above us. By the sound of their oars I knew that the boat was coming towards us, and I waked everybody. The captain got out his own rifle and every rifle and pistol that was in the float, and prepared to make fight. When the boat got within fifty or sixty yards, and we could just see it through the mist, our captain yelled out to them to stop.

"'Want to come aboard,' said a voice from the boat. 'We want to buy some pork and corn. We are camped here, and have got short of provisions.'

"'Haven't anything,' said the captain; 'not a thing. We have not a pound of pork or corn on board.'

"'What have you, then?' came from the boat.

"'We are taking a load of stone down to New Orleans, to sell — limestone, first-rate limestone; you don't want any of it.'

"The boat kept coming on, and somebody in it said, 'Come to think of it, now, we do want some limestone, and we will come and see how it looks.'

"The captain saw that we were in for a fight, as the fellows were determined to rob us. He brought his rifle up to his shoulder, but before he fired, he said once more, —

"'Now, I tell you, STOP!'

"The boat did not stop, but kept straight in our direction. The current swung it a little down stream, or they would have been on board of us before we could have done much against them; but luckily their stern swung around, and they had to turn a little against the current. The captain fired, and brought down one of the fellows in the boat. There were

six or eight of them, and only five of us. I had a rifle, fired, and brought down another.

"The captain's man fell into the bottom of the boat, b one I shot threw up his hands, and tumbled backward, s he went overboard. They began firing, but did not hi of us — except one ball, which clipped a corner of th tain's ear.

"By this time they appeared to have had enough of i besides, our shooting deranged their rowing. We were r ing, and before they could get up to the boat, we would another round of shots for them. They turned down s and that was the last we saw of them.

"In the morning we carried a line ashore, and tied tree; and with this line we managed to pull ourselves was tough work, that, and it was noon before we got We floated on down the river, and got to New Orle right. We sold out our load, and came home.

"The next year I went down again with the same c on another broad-horn. When we got to this place whe had been aground, we gave the sand-bar a wide bert avoided it; but we had another fight with the robbe night, when we were anchored. They came upon us su ly, when all but two of us were asleep. They got poss of the boat. They killed the captain, and sent me over What they did with the other men I never knew, but pose they killed them.

"The whole fight did not last three minutes, from th they first sprang aboard until I was in the river, and fl away on the water. I must have gone down the stream or four miles, keeping my head above water; and at came to the shore, right under a rocky cliff.

"I climbed up, and squeezed the water out of my cl By this time it was morning. I looked around, and s little way off, a curious looking hole in the rock, and some like a path leading up to it. I went up this path and int rock.

"A fire was burning close by the entrance, and I th

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somebody must live there. It never occurred to me that the place might be a robbers' cave. I shouted, and nobody came out. Then I picked up a brand out of the fire, and waved it until it blazed, so as to light me into the rock.

"After going about twenty feet along a narrow passage, I found myself in a sort of room, thirty or forty feet square. It looked partly natural and partly as if it had been dug out of a rock. There were piles of stuff where the men slept, and there were goods of various sorts lying around; but nobody was there. There was a bag of silver dollars which my eye happened to rest upon, and I picked it up. I then thought that I had got into the cave of the robbers, and that it was the same crew that was in the boat. I went out of that place quick, and it was well I did so.

"When I got outside, I could see the boat coming, not half a mile away, and those fellows on board. If I had staid fifteen minutes more, they would have caught me.

"There was no way of escaping up the face of the cliff without their seeing me, so I crawled down to the water, and slipped in again. I could swim well, and thought the best thing to do would be to float down the river a few miles farther, and then get ashore wherever I saw a house or a boat.

"I tried to keep the dollars, but they were too heavy; they weighted me down, and I very soon dropped them, consoling myself with the recollection that the robbers never would get them again. I floated half a dozen miles down the stream, saw a house, and went ashore. Next day a flat-boat came along with one hand short, and I shipped on her to New Orleans. After that I had two or three fights with the river pirates, but they never bothered me much."

LXI.

BURIED TREASURES.

CAPTAIN KIDD. — HIS HISTORY. — HOW HE MADE HIS FORTUNE. — HIS MELANCHOLY FATE. — JOINT STOCK IN THE ADVENTURE GALLEY. — SEARCHING FOR TREASURES. — STORIES OF THE SEA-COAST. — TRADITIONS. — ADVENTURE OF A TREASURE-HUNTER. — BILL SANBORN, AND WHAT HE DID. — JIMMY LETT'S DOG. — A PRACTICAL JOKER. — A MESSAGE FROM THE SANDS OF THE SEA. — BILL SANBORN'S DREAM. — FINDING THE CHEST. — A SUPERNATURAL VISITOR.

A NAUTICAL ballad, with which many persons are familiar, narrates the adventures of the celebrated Captain Kidd. It is composed in the autobiographical form, and its first verse runs as follows: —

"My name was Robert Kidd, as I sailed, as I sailed."

Evidently the distinguished pirate travelled, like many other robbers, under an alias; and it is interesting to know that his name was Robert Kidd *as he sailed*, for he certainly was not always Robert, but William, Kidd when on shore and away from his marine wanderings. It is to be noted that he draws particular attention to his alias, by repeating the words *as he sailed;* obviously wishing to state his case plainly, and guard against any imputation that he called himself *Robert* when on shore, or when his ship was at anchor or becalmed. It must have been very inconvenient for the man of tender conscience to change his name from William to Robert whenever his ship was in motion, and from Robert to William again when from any cause she stopped. It made things lively for him if he ever got into one of those peculiar squalls of the Mozambique Channel, where for two or three days you have a puff of wind one minute and a dead calm the next, so that your sails are alternately filling and flapping, and flapping and filling, about as fast as you can count. But, throwing speculation aside,

is sufficient to say that William Kidd was born about the middle of the seventeenth century, and followed the seas from his youth. About 1695 he was known as one of the boldest shipmasters sailing out of New York, and he became so famous that he attracted the favorable attention of the colonial government.

About the close of the century in which our hero was born, the depredations of pirates upon British commerce were so extensive that it was determined to send out privateers to attack the freebooters. The owners of these privateers were reimbursed for their outlay by the sale of the goods and ships captured from the pirates, and they calculated that they could make a great deal of money, provided they had a fair catch. One company, in which several noblemen were shareholders, asked the governor of New York to recommend a suitable person to command a privateer; and in consequence of his recommendation, Kidd received a commission, signed by the king, and addressed to "the trusty and well-beloved Captain Kidd, commander of the ship Adventure Galley."

The vessel thus put in charge of the enterprising William (not Robert) carried thirty guns, was a fast sailer, and had a plentiful supply of provisions, and a crew of about one hundred men. She sailed from Plymouth, England, in April, 1696, and cruised off the American coast for several months. She occasionally entered New York and Boston, where the crew was recruited until it included more than a hundred and fifty men. With this increased force Kidd finally sailed for the East Indies and the east coast of Africa. While on the voyage, he concluded that it would be much more profitable to turn pirate — at least so the story goes; and finding that his crew were not averse to the project, he became a freebooter of the most enterprising character. He captured many ships, and after filling the Adventure Galley with gold and diamonds, and all that kind of portable property, he returned, in 1698, to New York. According to tradition, he buried a large part of his treasure on various parts of Long Island, Staten Island, and the banks of the Hudson River, and then boldly sailed

into Boston harbor, under the impression that his royal mission would save him from any charge of piracy. unluckily for him, the Earl of Bellamont, governor of M chusetts and New York, was a stockholder in the Adve Galley, and was disappointed at the failure to declare a dend. He had heard of Kidd's indiscretions, and this k edge, added to the chagrin naturally attending the failu the enterprise as a financial speculation, caused him to a the gallant captain, and send him to London for trial.

At this day there are many persons who believe Kidd innocent of the charge of piracy, and they unhesitatingly that he did nothing more than carry out his orders. O trial, which was most unfairly conducted, the charge of pi was abandoned, as it was found impossible to prove it, an was arraigned for killing one of his crew, — William Moor in consequence of the mutinous conduct of the latter. It shown on the trial that Moore addressed insulting languag his commander, and was knocked down by Kidd. The b which was delivered with a bucket, proved fatal, and decision of the court was against the prisoner, on the gro that a bucket was not a proper weapon with which the c mander of a ship should enforce discipline. Had he prod him with a sword, or perforated him with a pistol, he mi have been acquitted; but this assault with a bucket was much. Times have changed since then. At the present we have the spectacle of the successful defence of murder on the ground that the weapons they used were not mur ous. I may instance the case of Foster, a conductor o street railway in New York, who killed Mr. Putnam wit "car-hook." One of the strongest points made in his fa was, that a car-hook is not a murderous weapon. Had K been tried in New York subsequent to 1870, he would h escaped the notoriety he obtained.

There was an interesting performance at Execution Do in London, on the 24th day of May, 1701. William K and the executioner performed a duet, which resulted in t death of the former, after an acrobatic exercise of so

fifteen or twenty minutes at the end of a rope. As a warning to the rising generation, and for the amusement of the elders, the ruins of the ex-pirate were left in chains at the end of a gibbet, where they swung in the wind for several years. Pious fathers used to take their sons to look at the pleasing spectacle, and counsel them never to turn pirate, and come to such a rope's end as befell the once well-beloved Kidd. Evidently the warning was effectual, as none of the London youths of that period were able to secure the command of an Adventure Galley, and sail to the Indian Seas. The suppression of piracy as a joint stock operation became unpopular, as it was not found to be profitable.

Many of the incidents narrated in the touching poem, "My name was Robert Kidd, as I sailed, as I sailed," are altogether apocryphal. According to history, Kidd left seven hundred and thirty-eight ounces of gold, eight hundred and forty-seven ounces of silver, and several bags of silver ornaments and precious stones. These were secured by the Earl of Bellamont, but whether they were ever handled by the unfortunate shareholders of the enterprise is not known. The probability is, however, that they were all required for the expenses of the arrest and trial of the pirate.

According to popular belief, the quantity above named was only a small fraction of the wealth acquired by Kidd: and down to the present time people have been searching localities on the New England coast and along the Hudson River, in the hope of finding some of Kidd's abandoned wealth. Tradition has been exhausted, and the chief reliance has been, especially of late years, upon dreams and the revelations of spirits. Almost every year somebody dreams of a locality where Kidd's treasures have been found, and he frequently gets wrought up to such a degree that he sets about digging for a fortune. Thousands of dollars have been expended in these researches, and they have invariably resulted in nothing. It is safe to say that nobody has yet found a dollar buried by Captain Kidd, and it is equally safe to predict that nobody ever will find one. The writer of this knew, in his

boyhood days, of several enterprises of this sort, [illegible] he never dug for Kidd's treasures, he was acqu[illegible] several persons who had been in the business. [illegible] abandoned it in disgust, and some still clung to th[illegible] they would one day be successful. They were [illegible] dreams and revelations that should indicate the p[illegible] where they could dig for the iron-bound chest, wh[illegible] bly contained the wealth they sought. An oaken [illegible] hoops of iron, was somewhere concealed, that shou[illegible] be theirs.

One garrulous old fellow used to be full of myst[illegible] the matter. His stories were a little incoherent, confident that he firmly believed them, and thoug[illegible] telling the truth. He was as superstitious as an [illegible] believed in all sorts of ghosts, hobgoblins, and dis[illegible] spirits in general. One day I happened to see him [illegible] was bewailing his ill luck a night or two before. [illegible] violent cold, and had swallowed a prodigious quanti[illegible] and molasses to drive it away. When I asked how [illegible] it, he became very solemn, took another "drain," as[illegible] it, and then proceeded to a confidential talk.

"Now, boy," said he, "I will tell you all about it[illegible] must first promise not to reveal my secret."

Of course I made the required promise.

"This was the way of it," he continued.

"One night last week, I dreamed that a spirit witl[illegible] light in its hand came to me, and told me to follo[illegible] lowed, and it led me to a place about a hundred ya[illegible] the river, where it set down the light, and told m[illegible] There was nothing to dig with, but as I looked at th[illegible] I saw a pick and shovel. I went to work with t[illegible] when I struck the first blow, the spirit went awa[illegible] and dug, but without getting tired. It seemed th[illegible] had been digging two or three hours, I struck a [illegible] could hear the pick hitting on it; and by and by the [illegible] it went through the oak, and I could hear the money [illegible] Just then I waked, and found it was daylight.

"Next night I dreamed the same thing again, and then I knew there was something in it. The second time I dreamed it, I tried hard to remember where the place was; and the next day I went up and down the banks of the river, in hopes of seeing it. But I couldn't find it, and what to do I didn't know. It was a revelation, sure, but the revelation wasn't clear enough, and I knew that something else was coming. Night before last it came."

He spoke the last sentence very solemnly, and as he did so, he moved his hand towards a box that stood near his arm-chair. I thought he was about to open it, and show me some of the wealth of the great pirate; but he only produced a fresh bottle of rum, and took another drink. Smacking his lips, he continued.

"Night before last it came. I was out by the swamp after dark. I had been looking for the place, and was just then going home, and thinking I would try it again next morning. I was walking along, thinking, and had my head down, when, all at once, I stumbled over something that made me look up again. And there, not twenty feet away, was the light — just such as the spirit carried in my dream, only it wasn't so bright."

I was about to say, "Will o' the wisp;" but I knew that if I did so, I should put an end to the story, and so I kept silence.

"I couldn't see any spirit, but of course that didn't make any difference, as I knew the light would take me to the spot. I didn't say a word, you may believe, but I looked at the light; and it hung there, looking at me. It didn't move for a minute, and then it began dancing along — not dancing, but sort of waving, like — and moving away from me. I followed it over bushes and logs, and through water up to my knees, and sometimes nearly to my waist, and never once took my eyes off of it. I must have gone half a mile or more, when I stepped into a hole, and fell flat in the water, down among the brambles. The pain was so sharp that I said something, and when I got to my feet again, the light was gone. And that is how I got this cold."

I tried to explain that the light which he saw was n supernatural, but he would not listen to my "boy foolis as he called it; and after a slight attempt to enlighten gave it up. He recovered from his cold, but kept his of fortune constantly in mind. I believe he tried ag follow the mysterious light, and with the same result fore. But his faith was not shaken, and to his dying believed he should yet find the buried wealth of Captain

According to my recollection, every story told by thi or any of his associates and neighbors, about seeki buried treasures, was full of supernatural occurrences the failure to obtain the hidden wealth was always attri to a failure to maintain silence. In this instance my attributed the disappearance of the light to his exclam when he fell; had he remained speechless, the light, opinion, would have led him to fortune. Repeatedly told of instances where the coveted chest had been re and only a few more blows were required to open it. air was full of unearthly noises, and the diggers were t and struck by invisible hands; but they heeded them no worked their best. But a blow heavier than the rest sight of the chest, caused an exclamation; when, inst the chest disappeared, and the hole which had been du human agency, was filled by a supernatural one.

Along the coast of New England, from the end of Island to Portsmouth and Portland, there are numerous ditions and other stories of Kidd's treasures. There are who believe that some of the pirate's wealth is hidden Lynn and Salem; others locate it near Newburyport; others, again, near Hampton, Portsmouth, and Kittery. three occasions I have made summer cruises near places, and whenever I sought one of these traditions, I erally found it. Places have been shown me where credu persons have dug for gold and silver enough to make t the envy of all their neighbors; and there is one spot, Lynn, where a man expended thousands of dollars, trying make an entrance into a cave, where, as the spirits told

treasure of an enormous value was concealed. His money gave out before the treasure was reached; and if it was there then, it remains there now, ready for any one who has money and inclination to prosecute the search.

A party of us, one afternoon, while loitering around Newburyport, fell in with an ancient inhabitant who was a firm believer in the existence of the wealth of Captain Kidd. He knew a great deal more than he would tell — or, at any rate, intimated as much to us when we endeavored to sound him. I will call him Bill Sanborn, as a cover for his real name, which I do not feel at liberty to print. He was a genius in his way, and when we had filled him with rum, and warmed the stiffened muscles of his time-worn frame, he was as talkative as a magpie. He wandered from his subject continually, and it was utterly impossible to tie him down to the main topic of his discourse. He had a son or a grandson — I forget which — keeping a groggery in Boston. The old man had recently been on a visit to the modern Athens, and evidently picked up considerable of the slang of the family bar-room, where he passed his leisure hours. His abilities in the absorption line were extensive, and I hardly dare to say how much he drank, and we paid for, before he was in a proper condition to tell about Captain Kidd. Finally we had him properly wound up, and after singing a few verses of the ancient ballad, with a tremendous emphasis on "as I sailed," he began.

"I might tell you a good deal about hunting for money, but I won't go and do it, because it might be doing injustice to some folks that ain't dead yet; and I don't believe in that, anyhow. There was Jim Follett and me. We struck a big thing once, and if Jim could have kept his hash-trap shut, we might have had money enough to buy all the rum in America, and keep drunk for ten thousand years. Jim is a good fellow, and likes to have a good time. He'd like to have it on his own money; but he don't have none of his own, and so he has to get other people's, which does just as well. Jim and me are pretty much alike, but I'm more like him than he is like

"The parson talked round a while, and finally he happened to see Spot, who was a setting up in a chair with his tail sticking out between the rounds, and looking as if he was just going to Sunday school, and was a saying his lesson over to hisself.

"'Ah, fine dog that,' says the parson to the storekeeper. 'Pears to look very gentle, and very intelligent too.'

"The storekeeper just then had his back turned, and we didn't say nothing. The parson patted Spot on the head, and said, 'Good doggie, good doggie.' Spot was getting ready for a growl, and began to peel his ivories like the ripping up of an old shoe. The parson didn't notice it, and kept on patting him, and said he could always make friends with any dog that he met.

"Jim was a sitting next to Spot, and reached out on the sly, and pinched the critter's tail. Spot made one grab for the parson's wrist, and hung on like a locomotive pulling a freight train. The parson jumped around, howling worse than a cayote, and his mouth was as narrow as a hole in a cast iron letter box. Bimeby the dog dropped off, and the parson went out of the door and off for home, as if he'd just had a call to marry a rich couple that couldn't wait. Jim and me laughed, but the storekeeper was mad, because he was afraid he'd lost the parson's custom. So he talked rough to us and drove us off, and we haven't been there since.

"Jim and me was over to Hampton one time, and loafing around a week or so among the boys. There was a gal at Hampton, mighty smart gal she was, and used to sing in meeting Sundays until you'd think she'd lift the roof of the meeting-house. Some of the young fellers was trying to shine up to her, but she shook 'em all off, and went sweet on a galoot that was keeping school over in the next town. He used to come to see her every week, and he always come on horseback. The Hampton boys sort of hated him, because he was a cutting them out, and so they used to rig up jokes on him sometimes. They'd tie the door of the house where him and his gal was, and once they took a big box and put it

up agin the door, so that when he walked out of the h walked into the box, just as though it was a front They hid his saddle once, and made him ride hom back; and the folks where he kept school said he di down much for three or four days afterwards.

"The next night after we got there the feller courting, and the boys asked us to have some fun with The hoss was tied under a shed, and right down th about a hundred yards away, there was a big mud- It run clear across the road, and we could see that wh feller started for home he would have to go right thro Jim looked the ground over, and told the boys to go an a hundred yards of strong clothes-line, and bring it to h

"When they brought the clothes-line, Jim said t 'Tie one end of the line to the post of the shed, and strong.'

"When they had done it, Jim says again, 'Now tak line and measure it right out to the middle of the puddle.'

"They measured it, and found that the other end just to the middle of the puddle. They brought the line bac Jim coiled it up close to the post, and then tied the loos to the crupper of the saddle. Meanwhile some of the r the boys had got an old cannon out into a field just behi shed, and loaded it up with a good charge of powder. everything was ready it was about a quarter to twelv we sat down to wait.

"The feller always started home at twelve o'clock, cau gal's mother wouldn't let her sit up no longer. The old said he might stay as long as he liked, but Mary must bed. He didn't see no fun in courting all alone to hisself, a he never staid after that time. Well, just at twelve o' we saw the door open, and heard a smack like bustin a box with a hammer. Then he said, 'Good night, dearest, he out to his hoss, unhitched the bridle, and jumped on out looking to see if things was all right. He hit the h poke in the ribs, and the critter humped himself at a g

straight towards the mud-puddle. The rope was unwinding easy and nice, and neither him nor the hoss didn't know nothing about it.

"When they had got almost to the edge of the puddle, Jim touched off the gun with his cigar. It sounded like a clap of thunder, and the hoss made one jump, and just as he did so he got to the end of the rope. The saddle come off, and the feller with it, and the beast went on as if he was running on a bet of ten thousand dollars, and had put up all the money hisself.

"As the feller tumbled off, he gave a yell that you might have heard fourteen thousand miles away. He thought a streak of lightning had struck the hoss, and that both of 'em was being swallowed up by an earthquake. The gal was standing in the door, and she gave a scream, and ran out and met the feller just as he got up out of the mud, and was making for the house. She got hold of him, and then she fainted, and went down into the ditch by the road-side, where there was a foot or so of water. She didn't stay fainted long; it warn't more than a minute before she was up again. Both of 'em thought it was a flash of lightning, until they got most up to the shed, and we could see them by the light shining out of the house. They was the sloppiest, muddiest looking pair that you ever set eyes on. The feller had on a claw-hammer coat, and the water was a dripping off the tails of it like the Falls of Niagara, and his white trousers was like an old map of Africa, covered all over with black ink for unexplored country. His hat was gone, and his hair was full of mud, and looked like a swab that hasn't been wrung out after washing the floor of a bar-room. If you've ever seen a hen that's been caught in a shower, and got under a cart to get dry, you'll know how that gal looked with her clothes all sticking to her, and she all ready to drop down again as soon as she found a good place. She said she never knew such awful thunder and lightning; and just as he said, 'Yes, dearest,' they stumbled over the rope, and then they see what it was. He hauled the rope in, hand over hand, jest as you'd

while he was a setting down, and wondering what to do next, he thought he saw something odd in the hole he had just made. He went for it, and it turned out to be the neck of a bottle; he pulled it out, and there was one of the curiousest bottles you ever see. It looked as if it might have been the bottle that Methuselah used to carry when he was a young bummer and went off on jambarees over Sunday. 'Now,' says Jim, 'I'll take this bottle home and show it to Bill Sanborn;' and sure enough, he did. We busted it and found it empty, and I ought to have said that if there had been anything into it Jim wouldn't never have brought it home without opening it.

"No, it wasn't empty neither. There was a piece of paper in it, a sort of dried-up, old parchment like, with some writing on it. The writing looked as if it was done in the dark by a blind man who couldn't read and was drunk into the bargain. We fussed over it a long time, but couldn't make nothing out of it, and after trying a dozen times, we laid it away and went to bed.

"I fell asleep, and pretty soon I dreamed that writing all out as plain as though it had been printed. I don't remember what it was now, but it told that there was something a hundred and twenty-three yards north-north-east, half east, from a certain rock: and I dreamed the rock out so, that I thought I should know it. Then I waked and lit a candle, and tried the paper again. and found I could read it all straight.

"I waltzed Jim out of bed in no time, and we determined to start off at daybreak. I shan't tell you exactly where we went, and I haven't told you the correct distance and bearings, because I want to try it again some time. Anyhow, we went there, and after a good deal of hunting we found the rock, and found a cross like a big X cut into it. Then we measured off the distance, and took the bearings with a compass we had brought along for the purpose. It turned out that a hundred and twenty-three yards north-north-east, half east, from the rock carried us beyond high-water mark; and as the tide was jest coming in, we couldn't do nothing. We

air. If he ever wants anybody to say he did his duty, let him call on me and Jim — that's all.

"We'd got out several pieces of the skeleton, and in five minutes more would have been in the chest. All at once Jim was took by the throat by one of them air ghosts, and at the same time a voice called out, 'Leave or die.'

"Jim dropped his pick and yelled 'murder' as loud as he could.

"In less time than you could hold a red-hot nail in your eye without winking the chest sunk down out of sight and reach, the dirt rolled in on us; and if we hadn't got out as quick as we could jump, it would have buried us. And the odd thing about it was, that the bones went in before the dirt did, and settled down jest as they were before we disturbed them. We had nothing more to do. Our fortune was gone, and it was all because Jim hadn't put a big plaster over his mouth so as he couldn't holler."

Here Mr. Sanborn took another drain at the bottle, and suddenly relapsed into silence.

LXII.

OPERATIONS AT HELLGATE.

HELLGATE AND SANDY HOOK. — ENTRANCES TO NEW YORK HARBOR. — HELLGAT AND ITS MEANING. — STORIES OF THE OLD VOYAGERS. — TORIAL JOKES. — MAILLEFERT'S OPERATIONS. — DEEPENING THE CHA — GENERAL NEWTON. — THE AUTHOR ON AN EXCURSION. — BLOWI COENTIES' REEF. — HOW IT IS DONE. — AN ACCIDENT WITH NITRO-GL INE. — THE AUTHOR'S NARROW ESCAPE. — DIVER'S EXPERIENCE. — A MEETING THE FISHES. — REAPTION AT HALLETT'S POINT. — GOING T THE REEF. — THE MEN AT WORK. — AN INUNDATION. — HOW THE REEF IS REMOVED. — SURVEYING IN THE WATER. — A GRAND EXPLOSION.

From the Atlantic Ocean there are two entrances into harbor of New York; one by way of Sandy Hook, and other through Long Island Sound and the East River. F steamer coming from Liverpool, the nearest entrance through Long Island Sound. The Sandy Hook entrance obstructed by sand bars; the channel is tortuous, and dents are not uncommon. The entrance to Long Isl Sound is broad and easy, but between the Sound and East River there is a very dangerous passage, which exte however, less than a mile. This dangerous passage is p larly known as Hellgate; the early Dutch navigators gave place its name. Tradition says that a Dutch skipper, nam Adrian Blok, called it the *Hellegat Riviere*, after a small str in Flanders, the place of his nativity. There is nothing phurous in the name, Hellegat, which is said, by one wri to mean "Beautiful Pass;" somehow, the transposition of word into Hellgate, has given it an infernal aspect.

The early historians of Manhattan and its vicinity scribed the Hellegat as a very dangerous place; one of earliest writers speaks of it as follows: "which being a n row passage, there runneth a violent stream both upon flo

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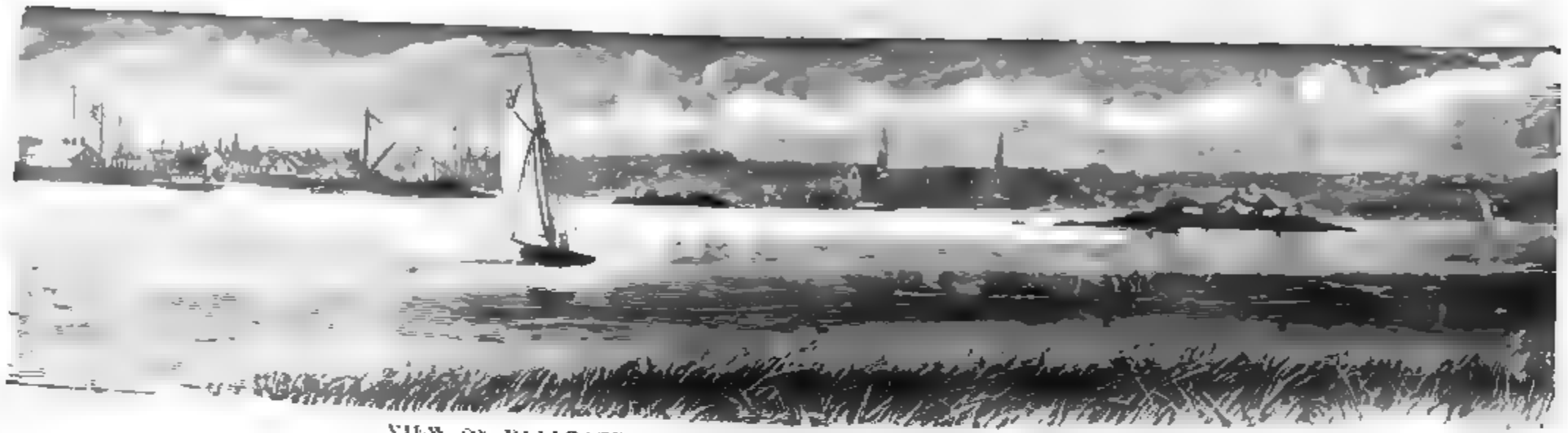
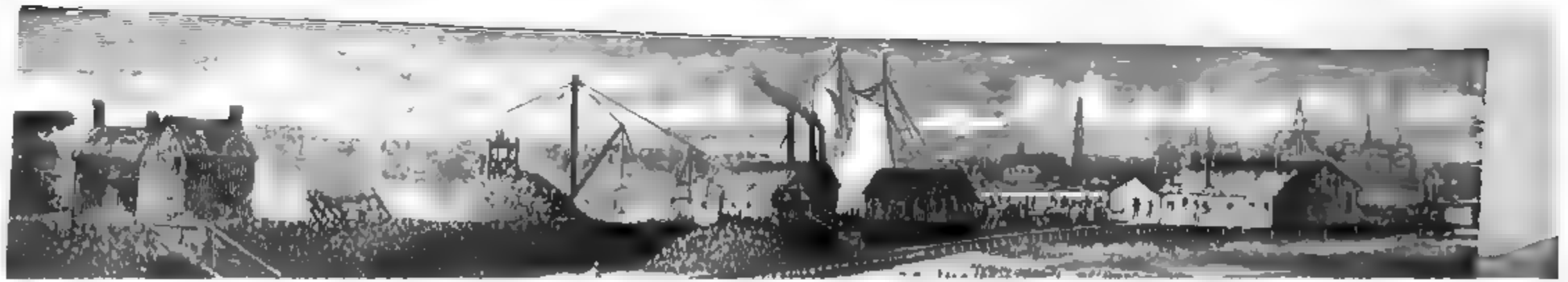


VIEW OF HELLGATE FROM NEGRO POINT, EAST RIVER, NEW YORK.



and ebb, and in the middle lyeth some islands of rocks, which the current sets so violently upon, that it threatens present shipwreck; and upon the flood is a large whirlpool, which continually sends forth a hideous roaring, enough to affright any stranger from passing that way, and to wait for some Charon to conduct him through, yet to those who are well acquainted, little or no danger; yet a place of great defence against any enemy coming in that way, which a small fortification would absolutely prevent."

Washington Irving humorously says of it, "At low water it is as pacific a stream as you would wish to see. But as the tide rises it begins to fret: at half tide it roars with might and main, like a bull bellowing for more drink; but when the tide is full it relapses into quiet, and for a time sleeps as soundly as an alderman after dinner. In fact, it may be compared to a quarrelsome toper, who is a peaceable fellow enough when he has no liquor at all, or when he has a skinful, but who, when half-seas over, plays the very devil."

Occasionally, certain witty editors of New York and Boston engage in little wordy contests in regard to the improvement of Hellgate: a Boston editor will say the widening and deepening of Hellgate will improve the entrance to New York! An editor of Manhattan Island will respond that the widening and deepening of Hellgate improves the road to Boston. Neither seems inclined to admit the existence of as much immorality in his own city as in the abiding-place of the other.

The removal of the rocks that lie in this passage between East River and Long Island Sound has been a subject of great anxiety with merchants of New York, and it seems a little strange that from the time of the settlement of New York until less than thirty years ago, very little had been done towards this work.

As late as 1845, the channel had not even been surveyed; and it was not until the Office of the Coast Survey was reorganized, in 1847, that a careful examination of this perilous

depth of twenty-five feet below low-water mark: that the work could be completed in six years, at a cost of about six million dollars.

Another plan included the removal of these rocks and four others in ten years' time, at a cost of nine millions of dollars; and he presented another plan, by which some of the middle rocks should remain as they were; and the most serious obstruction, known as Hallett's Point, could be removed in three years, at a cost of three millions.

Hallett's Point is the most dangerous obstruction in Hell-gate. From shore to shore the distance is about six hundred feet; the reef extends more than three hundred feet from one shore, so that the actual width of the channel is reduced to three hundred feet.

The water boils furiously over this reef, and turns a large part of the tide upon the Gridiron Rock, frequently throwing ships upon it. The process of drilling and blasting was considered too slow and ineffectual, and it was proposed to remove the rock by sinking a shaft upon the shore, undermining the entire reef, leaving pillars to support the rock until the work of undermining was all completed, when, by a single explosion, these pillars could be blown away, the whole reef would fall, and the dangerous obstructions to the commerce of New York would be removed.

One pleasant day, in 1871, I was one of a party to visit the scene of General Newton's operations. Our party embarked on a small steamer at the Barge Office, and proceeded up the East River, stopping on the way to examine the operations in progress for the removal of what is known as Coenties' Reef. This reef is about six hundred feet from Pier No. 8, on the East River, and lies directly in the busiest part of the harbor of New York, almost in the track of the ferry boats between New York and Brooklyn, and has always been considered very troublesome and dangerous. Attempts have been made at various times to remove this reef, but none of them were successful until the plan of General Newton was tried. The reef is about 250 feet long, and is 130 feet wide in its broad-

did not come off; some slight accident had happened, so that the slack water period had passed before everything was ready.

When the round of holes has been charged, the diver goes down. The pump to supply him with air is kept at work; the charges are lowered into the water one after the other, and placed in the holes where they belong. When he has arranged everything, he gives a signal and is drawn above. The boats then back away from the reef sufficiently far to be out of the way of the explosion.

The nine charges are fired simultaneously by means of electricity. The double wire, insulated with gutta-percha, extends into a small cartridge of powder, which is placed in the top of each charge of nitro-glycerine. The ends of the wire are brought quite near each other, and between them a small slip of platinum is soldered. The current of electricity, passing through the wires, heats this platinum to redness, and sets fire to the powder around it. The powder explodes, and its explosion sets fire to the nitro-glycerine. As the battery which furnishes the electricity is on board the boat, the current is thrown into each pair of wires simultaneously and thus the explosions occur at exactly the same moment.

A column of water shoots up into the air, the rock is torn and broken, and there is a general disturbance of the water all round it: ships and boats are warned, by means of a red flag, to keep at a safe distance. It generally happens that a good many fishes that have been swimming around the rock at the time of the explosion are killed, and rise to the surface; those that are not killed are very much astonished, and swim away with great rapidity.

The experience of a diver going down to arrange the charges is not highly agreeable. If he remains longer than the period of slack water, he finds the current so strong that it almost carries him off his feet; and it frequently becomes necessary for him to be drawn to the surface and abandon his work until the next turn of the tide. Should an explosion occur while he is below, it would be pretty certain to cause his death.

duced to a very large number of gentlemen, and most hospitably entertained.

Two or three days later, I was walking up Montgomery Street, and met a friend on his way to lunch at a well-known Club House; I would have accepted his invitation to lunch, only it happened that I had just breakfasted; and, bidding him good morning, or good afternoon, I walked slowly towards the Occidental Hotel. I had been there but a very few minutes before I heard a loud report, which jarred the whole building, and set people flying through all the corridors to ascertain what was the matter. I went out, and walked up the street the way I had come. The office of Wells, Fargo, & Co's Express was, if I remember correctly, two blocks away from the hotel. It turned out that the explosion which had jarred all that part of the city, was in the office of the Express Company.

To tell the story briefly, seventeen persons were killed, among them some of my personal friends, and as many more had been wounded. The Club House, where I was very near taking my lunch, had been blown up, and several persons who were sitting at the lunch-table were among the injured.

Among the boxes which had been on the steamer with me from New York to San Francisco, had been passed over the rail of the steamer at Panama, and which I had assisted in handling, there were two cases of nitro-glycerine.

One of these cases had exploded at the express office, its contents not being known, and consequently it had not been carefully handled, and in exploding it had set fire to the other. The force was sufficiently strong to cause a marvellous deal of damage, in and around the express company's building, to break hundreds, if not thousands, of panes of glass, some of them three or four hundred yards away; and all agreed that if those cases had blown up on our steamer we never would have been heard of afterwards.

"Suppose, now," said one of my fellow-travellers,—"suppose, now, those cases had exploded when we were taking them in at Panama. Why, the steamer would have gone, one half to the

bottom, and the other half up in the air, and some
have come down a thousand miles away."

A week or two after this explosion at San Fra
was one quite like it at Aspinwall, doing an amo
age equal to, if not greater than the explosion
cisco. Since that time I have had a wholesome fe
glycerine, and am always inclined to keep at a re
tance from it. It may be a very good thing in
may be entirely safe if properly handled, but I gr
that it should not be in my way, and that somebody
handle it.

From Coenties' Reef we went to Hallett's Point,
landed under the supervision of the general in ch
were delivered over to the hands of the superinte
Reitheimer, who entertained us very pleasantly, a
great politeness to the ladies and gentlemen of
especially to the ladies. He explained all about
and opened a mysterious case. In a very short time
were full of tunnels, drifts, headings, drills, champe
glycerine, reefs, derricks, pale sherry, and all th
thing. He showed us his plans and specification
induced us to step into a wooden box slung at th
derrick, and be lowered away into a pit of fifty or
in depth.

This pit formed a shaft which had been sunk
begin the operations upon the reef. From the sh
of tunnels extended very much like one's outstretch
Between the tunnels there were smaller tunnel
from one to the other, leaving pillars to support th
the water above. A strong dam had been built
mouth of the pit to prevent the water from floodin
tunnels or headings, as they were technically called
designated by names instead of numbers. Most o
working there were Cornish miners, and they seeme
of numerical designations. The superintendent origi
the central heading Number One, but it was changed
gut Heading. The others in order after it were Madi

VIEW OF SHAFT FROM THE DAM.

THE SHAFT, SHOWING HEADINGS.

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phrey, Hoffman, Sherman, Jefferson, Grant, McClellan, Franklin, and Jackson.

At the center of the reef the highest tunnel was known as Grant Heading. Nine feet of rock was left to form a roof. The rock was not very hard, but full of seams and fissures, through which the water constantly dripped. The narrow seams were closed by blocking, and when a wide seam was struck it had to be closed outside.

In one case the miners came upon a horizontal seam, through which the water poured at the rate of six hundred gallons a minute, and before the flow could be stopped, the miners were standing in three or four feet of water. Bags of clay were kept in readiness on the edge of the coffer-dam, over each heading, so that, whenever a seam was found, it could be closed as quickly as possible.

A large number of men were employed in these headings, drilling holes in the rock, and preparing for the great blast to come. For a long time, hand drills only were used, but the work was greatly facilitated by the introduction of drills operated by means of compressed air.

It was not until September, 1876, that the rocks of the reef were completely "honey-combed." The process left a roof of rock, supported by piers, which were so perforated as to secure their destruction by the blast. The quantities of explosive materials, finally decided upon by General Newton and his engineers, were estimated as follows:—Dynamite, 25,976 pounds; Vulcan powder, 14,244 pounds; Rend Rock, 9,061 pounds; Dynamite in Primers, 3,500 pounds. Dynamite is simply nitro-glycerine mixed with sand, and the Vulcan and Rend Rock are brands of strongest blasting powder. Connected with the explosive material in each of the sealed canisters was a copper wire, and all these wires were connected with the coil attached to twenty-three powerful electric batteries. Thus, the batteries were connected with each canister, and operated upon each, while each canister was connected with and operated upon all the others. To make all these connections, about twenty-three miles of wire was used. The excavations in the rock were

seething and boiling for a few seconds, apparently resumed its natural state. The concussion was slight, and crowds of people remained, in the vain expectation of witnessing something which would be on a more magnificent scale.

It was feared that the blasted rocks would pile up around the sides of the excavation, and form a dangerous temporary obstruction. As a precaution, three massive spar buoys were held in readiness to mark the locality until the work of sounding was finished, and the position of the *débris* discovered. The United States steamer Cactus on the afternoon of Monday, the 25th, began the work of laying out the buoys. The first sounding was made at a distance of two hundred feet from shore, along an arc around Hallett's Point and over the exploded mine. Tour after tour was made at greater distances from shore, and with the shaft deeper in the water. Not a rock or obstacle of any kind was encountered during the afternoon. In referring to the record of water found at the different soundings, the number of feet reported may be considered the amount of water at mean or average low tide. When the work of excavation began, the tide-gauge showed four feet of water over the average low water mark. The trial-shaft made the tour unhindered at a depth of sixteen feet, thus demonstrating a safe passage for vessels of such a draft at a point where the day before a giant rock protruded from the water. The last trial was made at three hundred and fifty feet out, and showed a depth of twenty-one feet at low water.

General John Newton may be said to have achieved a victory greater than any in war. The 24th of September ought hereafter to be celebrated as the jubilee day of commerce, and the anniversary of the greatest triumph of engineering science in history. The seven years' toil on Hallett's Point Reef at Hell-gate has culminated in a grand *coup de maître*, which was successful in every detail and in the full accomplishment of all the results expected, and all without a single disaster to human life. Begun upon a carefully matured plan—carried on with the quiet, painstaking persistence of science—the long labor of demolishing the great obstacle to navigation has at last been completed.

LXIII.

THE EARLY HISTORY OF MANKIND.

THE STONE AGE. — PICTURE OF ADAM AND EVE. — HOW EVE CUT THE — MINERS OF ANCIENT TIMES. — DISCOVERY OF STONE IMPLEMENTS INVENTION OF FIRE. — HOW GOLD WAS FOUND. — COPPER AND BR THE BRONZE AGE. — IRON AND ITS USES. — MINERAL PRODUCTS DIFFERENT COUNTRIES. — QUICKSILVER IN SPAIN AND CALIFORNIA WEALTH OF NEVADA. — ROMANTIC STORY OF THE COMSTOCK L MINERAL FUTURE OF AMERICA.

THE most extensively worked mineral substance present day is coal, yet it is the most recent of miner coveries. Iron, copper, tin, and nearly all the metals dug from the earth, and used long before the value of n coal was known.

In the earliest days of mankind, tools for various uses made of wood, bones, or stone. The first tools were un edly of wood, but the material was so perishable in its n that no specimens from those early days have come down Stone, being a harder substance than wood, and much durable in its character, rapidly took its place. The p when the human race was in its infancy has been pro classified as the "Age of Stone," for the reason that n that time was ignorant of the use of metal. Many imple from the stone age have come down to us, and are fou various parts of the world. In the copper mines on the s of Lake Superior, many tools have been found which were by a race long extinct, and of which we have no history.

In opening one of these mines, several years ago, more a hundred stone axes and wedges were discovered n large mass of native copper, which had been moved a distance, and supported upon sticks of timber.

No implements other than those of stone were found, and all of these had been broken in an unsuccessful attempt to cut the mass of copper in two. In various parts of America, Europe, and Asia, stone implements from the early days of the human race are found, and at the present time there are many savage tribes belonging practically to the stone age.

In some islands of the Pacific the people have not yet emerged from what is to us a very remote period. Barbarism under some circumstances may almost be considered perpetual.

The history of the early days of mankind upon the earth is very largely a matter of conjecture: much of it comes from tradition, and much of it from calculation. The great antiquity of the human race is a recognized fact, and geologists have shown that the period of early barbarism may have extended over tens of thousands of years. Civilization, properly speaking, began only with the discovery of fire and metals.

Some of the Greek mythologists say that Prometheus stole fire from heaven. The more prosaic fact is, that fire was first discovered by means of lightning, which set fire to the forests, and thus revealed to mankind a new element in nature. It is probable that our first parents in the garden of Eden had no knowledge whatever of this element, or of the metals, or even of implements of wood or stone. Consequently the enthusiastic artist of the middle age, who drew a picture of Adam and Eve standing in front of a fire to warm themselves, and represented Eve holding a knife in her hand, with which she was cutting slices from the fatal apple to give to the waiting Adam, was guilty of anachronism.

There are other conjectures of the discovery of fire, but they are purely conjectures. Fire may have been known from the earliest ages, through volcanic eruptions and streams of lava.

People who lived far away from volcanos may have discovered it from the spontaneous combustion of wood after hot and dry summers, or of masses of weeds and rubbish thrown together, and forming peculiar chemical combinations. It is possible that other people may have discovered fire by means

of flint, or they may have obtained it by rubbing two
of dried wood against each other, according to the pract
the present day among many savage people.

At any rate, it is probable that the discovery of fire
that of metals. Fires built against certain rocks may ha
cined them, and caused the metals which they contained
fused together. By some it is thought that the first
discovered was gold, which existed in the sands of the st
and would naturally attract attention by its shining a
ance.

Even if gold were the earliest discovery, it exercis
great influence on the civilization of the human race;
was otherwise with the discovery of the commoner n
From the time these were known, the human race made
progress, and written history began with them.

The discovery of copper and tin preceded that of b
which is an alloy of these two metals. Copper may have
discovered in its natural state, or in combination with
substances, which could easily be removed by the acti
fire. The metal was soft and easily fashioned, but ther
many purposes which it could not be made to answer.
localities where this metal was first discovered are not
tively known. Some contend that it came from India,
others give credit to that part of England known a
present time as Cornwall.

The alloy of copper and tin for the formation of b
grew into very rapid use, and it was made of various deg
of hardness, according to the purpose for which it was inte
Wedges, knives, axes, saws, fish-hooks, ploughshares, p
and a thousand other implements for the uses of peace o
war, were made of bronze. It could be melted and ca
moulds, or it could be hammered and fashioned at the wil
the smith. With bronze the art of moulding began. Br
was used for money. It was cast into utensils for kitch
and parlors, and other apartments of dwellings. It
fashioned into statuary, and sometimes into statuary of a
vulgar character. Weapons were made of it, such as

heads of arrows, lances, and javelins, swords, shields, and helmets; while it was useful in peace, it was likewise useful in war. A French writer has said, "The art of killing one another will advance at the same time as all the other arts."

Lead, silver, and quicksilver were discovered about the same time as copper. A long period may have elapsed after the discovery of brouze before that of iron. Doubtless this was in a great measure because bronze supplied all the requirements of the arts of peace as well as of war, and would naturally precede iron, because it was more readily and easily worked. The reduction of iron ore has always been a delicate process, and is attended with more or less difficulty. A strong current of air was required to give sufficient heat to melt the iron. It is quite likely that the first blast furnace was made from the hollow trunk of a tree containing a piston, moving up and down like that of an ordinary pump. This method is still in use among the Malays and the African negroes. While the Polynesians are still in the stone period, the Malays and negroes are just entering the first cycle of the iron period.

Some of the philosophers suggest that this is by the desire of the Ruler of the universe, in order to guide the civilized man of to-day in the study of the early history of his race.

For a long time iron was only used in its malleable form. The discovery of cast iron was not a prime necessity, since its place was well supplied by bronze. Historians tells us that cast iron was discovered about the time of the invention of gunpowder. It was used for making shot, and afterwards for making the guns by which the shot were projected. The English were the first to adopt them, and tried them against the French in the battle of Crécy, about the middle of the fourteenth century.

Step by step furnaces were constructed, and almost every decade witnessed some kind of improvements in their management. Then came the invention by which steel could be manufactured on a large scale. The rapid increase in the use of iron dates, as before stated, from the general use of mineral coal.

Pages could be covered with details of the uses of iron steel. The production and consumption of these m amount to millions of tons annually, yet the demand n exceeds the supply. They are fast replacing timber stone for many uses, and they are substituted for bron ornamental castings. No tools or weapons can be made out them. They constitute parts of nearly all machin and turn where we will, — wherever civilized men are t found, — we shall see iron and steel occupying promi places.

Deposits of metals are found in all parts of the gl Great Britain is rich in lead, and tin, and iron, and in s localities gold has been discovered. She furnishes ot countries with some of her metals, and those which she c not find in sufficient quantities for her own wants she bri from abroad. Many of the metallic ores of other countries sent to England to be smelted and reduced. On the conti of Europe there are copper mines, silver mines, iron mines, mines of nickel, zinc, and tin. Some of the deposits of met ores are very great. In one place in Swedish Lapland th is a hill rising out of the swampy ground, where there veins of iron ore, some of them two hundred feet in thickn Belgium, in proportion to her size, produces more iron th England. Along the valley of the Rhine and its tributar there are rich deposits of the various metals, some of them great extent. Russia is rich in mines; and as we go from l ropean to Asiatic Russia, we find that the richness continue

France has large supplies of iron, and on a small scale s possesses the other metals. In Spain there is great mine wealth, and some of the mines of that country have been c ploited for thousands of years. The most celebrated quic silver mine in the world is that of Almaden, situated in Spai and it has been continually worked for three thousand year Until the discovery and working of the New Almaden quic silver mine, in California, the famous mine of Spain controlle the quicksilver market of the globe. In Northern Italy ther are many districts rich in metallic ores. Throughout Asi

from the Arctic to the Indian Ocean, there are mines of all the metals, some of them of great richness. Mining industry in that part of the world is still in its infancy, and great discoveries and great progress may be looked for within the next hundred years.

In Africa, as well as in Asia, there are rich mineral deposits, though comparatively little is known about them. The new world is not behind the old in its mineral wealth. Every known mineral substance is found here; and there are evidences that the mines were worked thousands of years before Columbus made his famous voyage across the Atlantic. Some of the largest metallic veins in the world are in America.

Mexico, Peru, and other Spanish settlements on this side of the globe are almost unparalleled in richness. California alone has furnished an immense amount of gold to the hard money circulation of the world, and is destined to furnish still more.

Nevada and the territories lying around it have a wealth of silver unknown, and doubtless inexhaustible. The copper mines of Lake Superior have become famous throughout the world; and the iron mines of the great Mississippi valley and the Atlantic slope may yet supply the world with the most useful and most generally needed metals.

Probably the richest mines yet known are those situated on the famous Comstock lode, in Nevada.

From 1862 to 1865, including both these years, the mines on that lode yielded about forty-eight millions of dollars, and since that time the return has averaged more than twenty millions of dollars annually. The produce of silver from the Comstock vein is about one fourth of the entire amount furnished by all the silver mines in the world. It exceeds the aggregate produce of all European countries, and equals that of the entire western coast of South America.

A French engineer, who visited Nevada some years ago, wrote of it as follows: —

"Its extraordinary productiveness has made the Washoe region more famous for its mineral wealth than many places where silver ores have been found, and mined for centuries.

It has attracted an enormous civilized population. I built cities in the desert, and roads across high mou ranges, accelerated the union by steam of the Atlanti Pacific coasts of America, created a new branch of mini dustry in the Pacific states, and given successful employ to large amounts of capital."

The original mine of the Comstock vein is known a Gould and Curry. It originally belonged to two men v names it bears. Gould sold out his share for a pair of bla and a bottle of whiskey. Curry disposed of his interest horse and two thousand dollars. One of the mines o same vein was bought one day for two thousand dollars six weeks afterwards was sold for nine hundred thou Some of the most remarkable mining speculations ever k in the history of the world have occurred in Nevada.

A long story could be told of the various countries o world, and of the productions for which they are famous; it is hardly necessary in this place, and very likely woul come tedious. Scarcely any part of the globe can be menti where some mineral of value is not found, and the va substances seem to be distributed in such a way as to dev intimate relations among the various members of the hu family, and to draw nations nearer and nearer to each oth

England exchanges her iron and coal for the produc other nations. Spain sends her quicksilver. Chili sends copper. Mexico and Peru send their silver, and receiv return the articles which they need, and other nations spare. Other countries send their minerals to distant kets, and receive in return the products of the count where those markets exist. America, with her mines, is c paratively in a state of infancy; but the day will come — it is not far distant — when she will be the great supply centre of a large portion of the globe.

LXIV.

DIAMOND AND OTHER SWINDLES.

THE GREAT DIAMOND SWINDLE OF 1872. — HOW IT WAS ORGANIZED. — MAGNIFICENT PLANS OF THE SWINDLERS. — PLANTING A DIAMOND FIELD. — HOW THE FRAUD WAS EXPOSED. — A NEAT SWINDLE ATTEMPTED IN SAPPHIRES. — HOW IT WAS DISCOVERED. — A MYTHICAL COPPER MINE. — FATE OF THE SWINDLER.

THE great diamond swindle of California will probably go down in history as one of the most magnificent frauds of this or any other age. There are some facts about the matter which have not yet been given to the public. When the operators first started their "plant," they went to New York, and endeavored to enlist capitalists in that city. A friend of mine was thrown into contact with them, and from him I learned the points. They wanted half a million dollars for their claim. He looked at the diamonds, which appeared to be genuine, and he was allowed to apply the usual test of rubbing with steel files and with emery. They stood the test, and he offered to put ten thousand dollars into the scheme. Another friend (a friend of my friend) came forward, and as he had some money to spare, he was allowed to investigate the business; the twain were prepared with more files and emery, and they rubbed more of the diamonds.

The test was going on satisfactorily, when my friend, whom I will call Sharpley, happened to lay hold of a stone that yielded to the hard substances against which it was brought. Sharpley tried another side of it, and again it yielded. He was handling a piece of common crystal, and not a diamond, and his eyes were beginning to open. He became inquisitive enough for a son of Paul Pry, and the result of his question-

ing was, that he didn't put his money into the sp
Straightway he sought his friend, and actually fo
arranging to draw the check that would have ma
twenty thousand dollar stockholder in the great diam
of Arizona.

Sharpley talked to him like a Dutch uncle, and w
difficulty induced him to withhold the money for the
I say with difficulty, for Sharpley's friend had be
enthusiastic over the diamonds as a damsel of sixte
her first beau, and was determined to go in anyhow.
suspected that Sharpley wanted to keep others out so
could get more stock for himself, and subsequently, w
stock was all taken, he upbraided Sharpley for keep
out. He does not upbraid much now, but, on the c
quite the reverse. When the exposure came out, he
how his twenty thousand dollars had been saved, and
bered that Sharpley had been the cause of its salvati
sent a basket of the best champagne to Sharpley's of
it was while drinking a glass of the beverage
recipient told me of his diamond experience.

"It was one of the best laid plants I ever sa
Sharpley, "and if it had not been for stumbling on th
of crystal, I might have been taken in. They tried to
to me that the crystal got in there by accident; but
had previously told me that every stone in the collec
been examined by an expert, I knew there was a li
where. They had a few rubies, which they claime
found in the same locality, or near them. I looked a
and was allowed to take one of them to a jeweller, w
nounced it genuine. That night I overhauled my
pædia, and studied up the character of diamonds and

"I found that the diamond consists of crystallized
while the ruby, sapphire, and all that class of ge
crystallized alumina. Next morning I went to one
best geologists in New York, whom I happened to kno
and asked him if crystals of carbon and alumina c
found in the same locality.

"'Most certainly not,' was his reply. 'Such a thing may be possible, but I doubt it very much.'

"'What would you say,' I asked, 'if a man showed you a diamond and a ruby, and told you they were found side by side?'

"'I should ask him if he knew the man that put them there; and if he insisted that they were natural deposits, I should change the topic of conversation for fear of saying something to wound his feelings.'

"I left the professor," continued Sharpley, "and made up my mind to have nothing to do with the speculation, although I confess I was greatly puzzled. Apart from the statement of the geologist, and the discovery of the crystal which first caused my suspicions, everything appeared right enough. The parties were respectable, polite, intelligent, and wanted a good price for their property, or rather for half of it, as they only desired to obtain money to work their claim. They would not reveal the locality of the discovery, as it was upon unsurveyed ground, and they desired the passage of a bill by Congress to confirm their title to it. The *mesa*, or diamond-bearing ground, was minutely described, and was very much like the diamond-bearing localities of Brazil and India. Professor Janin, a scientist of repute, had been there, and staked his reputation on the genuineness of the discovery. He was sworn to secrecy, in order that there should be no jumping of the claim by the adventurous fellows who abound on the frontier, and to keep off everybody, in fact, until the proper title was secured, and the company was ready to go to work. Several persons who had investigated the matter as extensively as they could, were convinced of its correctness, and were ready to invest.

"Furthermore, the operators were anxious to get the claim to their land, and spent money to get it. General McClellan, Samuel Barlow, and others went into the operation, and you may be sure they don't risk their money unless things appear pretty certain. McClellan, Barlow, and the rest, whom I will call the New York party for the sake of convenience, offered

four hundred thousand dollars for the half interest, the money ready to put up. I surely expected the ' would take this and clear out, as they would then handsome profit on the speculation. But they refused as they could get no more, they took up their diamonds and went away. This again made the th genuine, and I was more puzzled than ever. I began I had put in my money, and it was then that my whose champagne I am drinking, blew me up for dis him from investing. I soothed him, and we determ keep our mouths shut, and wait for what would turn u

"Well, to shorten up the story, the planters w San Francisco and got Ralston, and the rest of them to When the company was organized, the New York party to regret not having taken the thing at half a millio they felt so bad about it that they asked the Ralston cr let them in on the bed rock organization. They urg time, money, and influence they had used to get the from the government, and begged so hard that Ralston's finally gave them a chance. They won't tell how muc lost, but I think there were five of them stuck for about t thousand apiece. There were other small fry, but they not of much account.

"Now, there is another thing that hasn't come out y I am sure it will one of these days. There is a rich d of diamonds on this continent of North America, and so the stones which have been exhibited came from it. of the diamonds used in getting up this plant were bou London, and came from Brazil and South Africa, but were others that certainly came from no diamond field known. At least that is what some of the experts sa if all the parties interested in the purchase of the A mines, — I do not mean those who sold, but those who b the half interest from the swindlers, — if all these p were catechized searchingly, I have reason to believe some of them would or could tell something that wou quite as startling as the original story of diamonds in Ar

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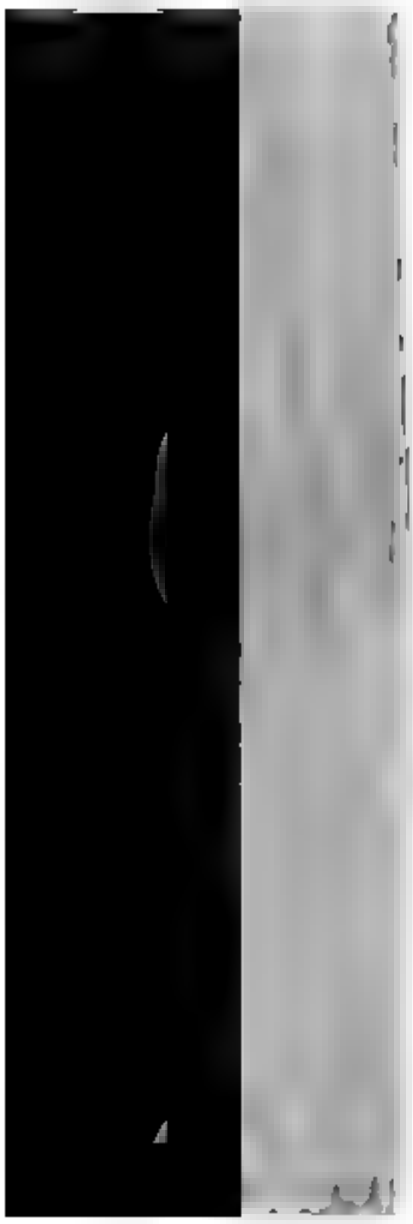
They had already taken steps to secure this new locality before the Arizona swindle was exposed, and had it not been for the sudden death of a gentleman connected with the negotiations, the business would have been completed ere this. The negotiations were hindered by his death, and it may be months before they are completed; but you can certainly look for a revelation some time in 1873 of great interest concerning diamond fields of wonderful wealth."

"Why," I asked, "did not the Arizona swindlers get up their speculation on the real diamond fields of which you speak? They could have made more money, and avoided the stigma of dishonesty which they must bear as long as they live."

"Simply because the swindle was much the easier thing. The real fields are practically inaccessible, except to a large and well-armed party, and under the sanction of another government than our own. A concession to hold and work them must be obtained, and this would take a long time. I will say this and no more — that they are north of the Isthmus of Darien, and are not in the United States. You may guess about their locality as much as you like, but for the present I can say nothing more. You see it was much easier to get up an excitement about Arizona or Colorado, and turn it into money, than to wait and work on the genuine enterprise. Men are not generally inclined to dishonesty unless they can make something by it."

So endeth what I have to say about the diamond swindle.

Some other transactions of a kindred sort have come to my knowledge, and they may properly be told in this connection. A few years ago I was interested in the study of crystallizations, and made some experiments in the laboratory of a chemical friend. We tried a long time to get up rubies and sapphires, and followed the processes of Ebelman and Gaudin as closely as possible. Artificial crystals of alumina have been produced, but they have always been so small as to require a microscope for their discovery, and any attempt to color them has failed. In the course of our experiment we



to see me, and said he had called two or
ness of importance, which he could only
We made an appointment for that
away.

I was on hand at the appointed hou
locking the door, the professor became c

"You remember your experiments to
he said, "and you also remember that I
them. When you were disheartened an
abandon hope, and at last I have been re
duced a perfect sapphire by following
yours. You used alumina and boracic
using the same things, but have added
oxide that gives the color to the stone a
it facilitates the crystallization. Here i

As he spoke he opened a table draw
box produced three beautiful stones.
sapphires of correct shape, color, and
great deal of money. They reflected th
short time I saw a fortune before me.
them thoroughly and placed them on th
continued: "Now, these are sapphires
tory — just as Nature has made them i

thought the whole thing over, and determined upon a plan. We will form a small company, the fewer men in it the better, and fit up a laboratory in connection with a tin shop, or something of the sort. The shop will be a blind to prevent suspicion, and the laboratory can be in the rear, where we will pretend to have a new process for soldering tin. When the stones are made, we can put them on the market slowly, and sell them just fast enough to prevent getting up a panic."

He went on with the details of his scheme, which was plausible enough, only it was a trifle too large. Had he been an adventurer, I should have suspected him at once; but here was a scientific gentleman, whose name was on the title page of a book that had been received as an authority, and, so far as I knew, his reputation was without blemish. I was captivated by the brilliancy of the enterprise, and readily consented to join him and bring the matter to the attention of some of my friends. He wanted about twenty thousand dollars for a share in the secret, and as capital wherewith to set up and stock his proposed laboratory. To wind up the evening and leave me fully convinced, he opened a crucible, which, he averred, he had that afternoon taken from the furnace and laid away to cool. From the black mass of slag at the bottom he extracted a couple of sapphires, smaller than the ones he had previously shown me, but as perfect in every way as the others. My mind was nearly but not quite made up. I asked the privilege of taking one of these latest sapphires, and also one of the others, to show to a friend whom I wished to join me in the speculation.

The professor consented, with the injunction that I must not reveal the secret of their manufacture, and that I should be very cautious about exciting the suspicion of any outsider as to their artificial character. "We must be very careful," said he, "not to let the dealers know that the stones are not dug from the ground, like all others in the market. They are in every respect the same, but the question of demand and supply tells more readily on precious stones than on anything else that men deal in."

Next morning I jumped into an omnibus and rode dow town. I went to a lapidary on John Street, with whom I h a slight acquaintance, and at once showed him my sapphire He looked at them just an instant, and asked what I wante to know about them. I asked what he called those stones.

"Well," he replied, with a smile, "they are very good im tations of sapphires."

"Imitations!"

"Yes, imitations; I ought to know, for I made them my self."

A gigantic flea at that instant — a flea as large as an ele phant — entered my right ear, and jumped about like a school boy exercising across a gutter. The lapidary continued, that he made the stones to order, and three others at the same time, about a month before, but declined to tell me for whom they were made. They were made of strass, a fine article of glass, consisting mainly of potash, oxide of lead, borax, and silex. Nearly all artificial gems are made of strass, and the colors are obtained by adding certain oxides while the substance is in a state of fusion. Diamonds, sapphires, rubies, and amethysts, made of strass, may deceive a novice, and even be made so skilfully as to require a careful test before deciding on their character; but you can no more sell them for genuine to a regular dealer than you can make a butcher buy a poodle under the belief that it is a bull-dog.

I returned the gems to the professor that evening, with the brief explanation that my friend was averse to a speculation on account of a lack of funds, and that an unexpected development had rendered it impossible for me to invest. He did not press for an explanation, and we separated with mutual regrets.

Another time a man who had been for several years on the Pacific coast came to New York, and lived a month or two at my hotel, without any appearance of business. I formed an acquaintance with him one day at the table, and found that he was a good talker, and well informed on mining matters. Our acquaintance ran on a week or so, and one day he invited

me to his room, and showed me some specimens of copper ore. They were of wonderful richness, and while I was looking at them he explained that he knew where there was a vein six feet wide and a half a mile long of just such ore. He said it in the most careless way imaginable, and remarked that he thought he had about as good a thing as there was going.

I thought so, too; and after a few minutes' conversation we separated. Nothing more was said for several days, when finally he asked if I knew anybody who would like to join him in working the mine and sharing the profits. There was more than he wanted for himself, and he would like to be relieved of the trouble of looking after it. The mine was on the Colorado River, in Lower California, and was a very easy one to work. I took some of his samples of ore, and showed them to a speculating friend, who said, "This is a wonderfully rich ore, and there is no end of money in it, if he is talking the truth. It is worth looking into, but we must be cautious."

Ten of us formed a company, and agreed to pay him a hundred thousand dollars for a half interest in the mine, if it turned out as he represented. He described it minutely, over and over again, and his story appeared perfectly plausible. He was ready to go there with any of us, show us the property, and satisfy us that he had told the truth. We sent one of our number to California with him, and at San Francisco a couple of gentlemen, to whom we had written, joined the twain, and made a party of four to go to the copper mine. All the way he talked about the mine — from New York to San Francisco, and from the latter city to the Colorado River. Several copper mines had been opened in that region, and he spent a day escorting the party among the reduction works of these companies. Up the banks of the river he led them about twenty miles from the last of these mines, and then acknowledged that the whole thing was a deception, and that he had no mine to sell.

The two Californians proposed shooting him on the spot; but the New Yorker had a prejudice against shedding blood, and persuaded his friends to let the scoundrel escape. He

did not return with them, and he never reappeared in N
York; but he did turn up in San Francisco, where he sold
ten thousand dollars (and obtained the money for it), a qua
interest in a mine to which he had no more title than I h
to a township in the moon. He was a plausible wretch,
could look you straight in the eye while telling a lie as
and as plump as the swelled head of an Irishman the morn
after a wake.

I believe he was subsequently mistaken for a coyote,
shot by a miner whose claim he had been endeavoring to st
and sell. The miner regretted the mistake, or, at all even
said that he was sorry that somebody else had not made
mistake, and made it earlier.

LXV.

PERQUISITES.

CURIOSITIES OF COMMERCIAL TRANSACTIONS. — PAYING COMMISSIONS IN EUROPE. — FUNNY EXPERIENCES. — SPREAD OF THE CUSTOM IN AMERICA. — HOW CONTRACTS ARE OBTAINED AND PAID FOR. — COMMISSIONS TO TRADESMEN AND OTHERS. — CURIOUS FEATURES OF THE PIANO TRADE.

AMERICAN travellers in Europe frequently express astonishment at the commission system which prevails there among all classes of people. From the moment you land on European soil till the moment you leave it, you are the subject, or rather the object, of commissioners of every possible variety. I do not refer to the parties who expect and require you to pay money for direct services, but to those who make money out of you in an indirect way. You step on the dock at Liverpool or Havre, and an officious porter takes you in charge, and hands you over to a cabman. You pay the porter for his services, and think that the money you give him is all he receives. Not a bit of it. The cabman gives the porter a commission on the money which you pay for your ride, and very often this commission is a heavy one. Instances have come to my knowledge wherein the porter or servant engaging a carriage was paid twenty-five per cent. of the fare; and I once looked from a door-way in Rome, and saw the cabman give my *valet de place* exactly half the money which the former had received from me; and I had paid him only a few cents above the regular tariff. The couriers, or travelling servants, receive a commission on the hotel bills of the tourists whom they accompany, and also a commission on nearly all their bills of whatever sort. If you make purchases in shops, it will very likely make a difference of five or ten per cent. in

Paris, and to see the capital in its gayest and most prosperous times. Every Parisian, in whatever business engaged, was counting upon making a fortune, or, at all events, upon laying a broad and solid foundation for it. Prices were exorbitant; trade was brisk, and money was plenty. For had not the foreigners come from all parts of the globe, with abundance of cash, which they were scattering as the farmer scatters the grain he sows? The police came to the relief of the much-defrauded public; but though they regulated the cabmen and other public personages, they could not regulate the shopkeepers Merchants would coolly demand a hundred francs for an article worth no more than twenty, and when you taxed them with an attempt to swindle, they explained that they must live, and that rents were very high. One day I found a small spot of grease on my hat, and stepped into a hat store close by the Grand Hotel. The shopman examined the hat for at least a minute, and then sent for the foreman of the work-room. The latter came, and the twain held a solemn consultation, that resulted in a proposition to eradicate the obnoxious grease if they could have three days' time, and at an expense of twelve francs. I declined, and walked out. The same afternoon, at a small hat store in the Latin Quarter, the stain was removed inside of ten minutes, by the use of a hot iron; and the whole work cost but half a franc.

There were lots of Americans in Paris at that time, and the most of them did not know enough French to swear in, much less to make a purchase, or order a breakfast. They used to fall upon such of us as knew the language, and compel us to act the part of valets in accompanying them on shopping tours. Very soon we were utterly sick of this amusement, and used to invent all sorts of excuses to be rid of it. One day I had some fun that lasted me a week at least, and was a standing joke, which several of my friends enjoyed hugely. A gentleman and lady of my acquaintance induced me to accompany them to a shop on the *Rue de la Paix*, where I was to act as their interpreter in some projected purchases. I was the go-between in the transaction, and faithfully ren-

History records that the Mayflower was very poorly equipped when she sailed with the Pilgrims for Plymouth Rock, and that the contractors who furnished her did not comply either with the letter or spirit of their agreement. If the matter could be investigated, I have little doubt we should find that the contractors were obliged to pay a commission to somebody, and that they found it so heavy as to take away all their profits, and compel them to the dreadful alternatives of being dishonest or losing money by the operation. At any rate, this is frequently the case nowadays, and I have known a man to be pressed so sorely by the commission-seekers that he found a contract, originally supposed to be very fat, to turn out so lean as to be no better than a skeleton. Particularly is this so with matters connected with the city government in New York.

In the days of the Ring, a man would seek, we will say, a contract for paving a certain number of streets. He would pay a member of the Board of Aldermen to introduce a resolution authorizing the said pavement. Then a committee would be appointed to investigate the matter, and the committee would need something to help support their families, and also to secure a favorable report. Next it would be necessary to interview a sufficient number of the members to make a majority, and then the resolution would go through. The same course would be followed with the Board of Assistant Aldermen before the resolution would become a law of the city, and enable the pavement to proceed. And when the work is finished, there is trouble about getting the money for it. First comes the inspector, who is to pronounce upon the work, and say whether the terms of the contract have been met. His salary is small, and his expenses are large. He is the head of a numerous family, and is required to contribute to the success of his political party; and such success requires money. A judicious salve of greenbacks spread over the contract enables him to see as he should see, and he reports favorably. Then come the Board of Audit, Supervisors, and the like. They may not all need money; but there are

certain members and *attachés* who are poor, but
and are struggling manfully against the floods and
this wicked and weary world. Delays are dange
vexatious, and to secure expedition and favorab
there is nothing so good as money. And then the
work of getting the money after the payment has
dered, and very often somebody in the financial de
of the city and county of New York will demand an
his commission. Then there are outside bills to pe
influence, and when one has been settled, another and
will make its appearance.

I have made no fancy sketch. This is the history
a contract — probably of most of the contracts —
city government of New York in the past twenty-fi
And it is for this reason that such exorbitant prices
for paving, street cleaning, and all other city work;
for this reason that many contracts which appear exc
profitable on their face, really furnish little or no p
have known several men who had large contracts
they actually lost money, and I have in mind one
driven into bankruptcy by a contract out of which
pected to make a large amount of money. He had ca
upon a shave of fifty per cent., and made his terms
ingly. But his actual proceeds were only twenty-
cent. of the face of the contract, and even for that an
was compelled to wait so long that he could not meet
standing bills, and became a financial wreck. Other
ernments may be bad, but I think none of them are
that which has its scene of operations on Manhattan
I leave out of the case altogether the forgeries an
bills of the Ring operators, and consider only those
which may be classed as strictly legitimate.

There is a good little story which is told of a note
keeper, whose name I will not mention, though th
dozens of New Yorkers who can give it, and can vouch
correctness of the narrative. Some years ago ther
foreign embassy here, and the city government showe

attentions to it. Our Boniface obtained from the Board of Aldermen an order for a grand dinner to the embassy, and a splendid affair it was. The bill was about three times what it should have been; but Boniface was a good fellow, and agreed to divide with the aldermen if they would put it through. They did so, and, what was more, they ordered the immediate payment of the money. It was paid; and Boniface sent word to the members who had befriended him to come to the hotel at a certain hour, next day, and he would do the handsome thing. They came promptly, every man of them, and were assembled in one of the parlors. Boniface was among them, with a greeting for everybody, and he poured out his wine in the most liberal manner. He was a good talker, and kept them amused with his wine and his stories for a full hour or more. But time was pressing, and some of them hinted that they had better end the business, and separate.

"Don't go yet," said Boniface; "take some more wine."

They took it, and hinted that they came for the divide.

"Take some more wine, boys; I'm going to do the handsome thing."

"But that divvy, Bonny," urged one of the party. "We can't stay longer, as we have a meeting this afternoon, and it is almost time for it."

"Boys," said the hotel-keeper, "I've just ordered a basket of this wine for each of you, and you will find it at your houses when you go home."

"Hang the wine! We want that money, and that's what we came for."

"Now, boys," said Bonny, seating himself in an arm-chair, and smiling till his mouth resembled the entrance to a railway tunnel, "I suppose you'd call me a d—d skunk, if I went back on you, and didn't hand over a cent."

"Of course we should," said half a dozen, almost in unison; "but we don't think you'd do that."

"Well, that's just about the size of it," he replied. "I've got the money, and mean to keep it. You may have all the

and without further parley drew a check for fifty dollars, which consoled the unhappy matron, and turned her sorrow into delight. When another boarder dies she will not forget this slight testimonial of the undertaker's respect and esteem.

Many a nice young man about town is clothed free of expense by fashionable tailors who have an eye to business, and know it is to their advantage to keep the much viewed swells in fine garments. Grocers, butchers, bakers, and all men of their ilk, pay commissions to house servants much oftener than their employers imagine. The custom has become very general in New York in the past few years, and in some households the wages of the servants are the smallest part of their incomes. On New Year's day the grocers send presents to the servants, generally a bottle of whiskey or gin to each cook or kitchen maid, and the result is, that, in a good many houses, the servants below stairs, on the first day of January, are quite as drunk as the majority of the visitors and entertainers in the parlors above. At the railway and steamboat landings, the hackmen frequently pay commissions to the policemen who allow them good places in the line, and do not press them to move on. Policemen, by the way, make a great many commissions — when their consciences are flexible — from gin-shops, gambling-houses, and other establishments which may as well be nameless, and in the same way hotel clerks and hackmen are enabled to add materially to their regular incomes. The hotel clerks come in for commissions on the tailors, and the same is the case with others who come in contact with strangers. For example, there is a tailor in New York who is understood to have friendly relations with one of the consulates, — I don't mean with the consul, but with some of the subordinates. When a foreign traveller drops into this consulate, and says, "I want some clothes, you know, and I want to know, you know, where I can find a good tailor, you know," some one is moved to say, "My dear fellow, you know, go to ———'s; here's his card; awful nice tailor, you know; will just suit you, my boy." The traveller

of avoiding a dispute as to the validity
commission. Jones, from the country,
Bangup Hotel, and asks the clerk to dir
respectable gambling-house, or something
a stranger in town, and doesn't know the
him, for instance, that Heenan's or Morr
he wants, and draws from his pocket a
printed the name of the clerk of the
writes on the back thereof, "This is my p
Jones: treat him kindly; show him every a
it to me." "Be sure and hand him th
enjoins; "otherwise he won't know you,
any more attention than anybody else."
card, is treated politely, and often leaves
so in the house, and is satisfied. So also
he receives his share of the proceeds.

A few years ago there were two hotels
and the other in a western city, which we
half-way partnership. Suppose you wer
New York concern, and were about goin
mine host of Manhattan would say, "Let m
to my cousin," and forthwith he wrote a w
you were represented as a particular frien

went to the house named in it. I never knew anybody who received any special courtesy in consequence, but he generally found his bill from twenty to fifty per cent. higher than it would have been had he brought no introduction. The two hotels played that game a long time before travellers found them out, and it was astonishing how long it took to discover the trick. A friend of mine once arrived here from the hotel at the other end of the line. I met him at the dock, and urged him to go to the house where I lived. "No," said he, "I have a letter from ——— to his cousin here, and I am going to that hotel. Just look at that letter." I read the document, which was one of the most fulsome things you ever saw, and would clearly entitle my friend to canonization. He went to the hotel, was politely received, crammed into a room under the eaves, and about as large as a cigar-box; could not get moved lower down, though they promised every hour that they would transfer him on the next; and after staying there four days, left in disgust, with the additional affront of a bill, in which there were all real and several erroneous extras at the highest possible or impossible rates. The real wording of that letter should have been, —

"This is one of our patrons; stick him in anywhere, and charge him all you can."

I presume the business that pays more commissions than any other is that of making and selling pianos. In the first place each large establishment usually keeps a man to write its advertisements and look after its business relations with the press and advertising mediums generally. One manufacturer, a shrewd foreigner, is understood to employ one of the musical critics, who not only prepares pamphlets and advertisements, but devotes his criticisms as far as possible to the interest of his master. Then, most of the distinguished pianists who come here are each paid by some one of the manufacturers to toot for his piano. If you look at the programmes of these piano concerts and recitals, you will generally see a line announcing "The Muggins piano is exclusively used at this concert, and recommended by Herr Ivorypounder." One pianist, now in this

country, was brought here by a piano maker who guarant forty thousand dollars for a six months' tour; and anot foreign pianist, now here, has a similar guarantee of twe thousand. It is safe to say that half the noted foreign piani are imported by the piano makers, and that half the rest engaged and subsidized by the makers soon after they here. Then, most of the concert tours are backed by piano men; and I know several instances in which they ha been directly organized by them. They may lose money the tour itself, but they make money out of the extra sales pianos. Then they are obliged to pay commissions to mu stores and to music teachers who recommend their wares a effect sales, and frequently to persons totally unconnect with musical matters, such as upholsterers, carpenters, a friends of the families where pianos are bought. I know instance wherein a man who was paying attention to a you lady received two hundred and fifty dollars from a piano deal for turning the attention of his loved one from the instrume of Stiggins to that of Wiggins. He accompanied her to t store, where she made her purchase; her papa sent his che next morning, and in the afternoon her dear Charles Augusti called for and obtained his commission. And he is not t only society man, by a long way, who makes something out the piano dealers.

The daughter of a wealthy citizen not long ago wanted piano, and the wealthy citizen told her to select one. Th house was undergoing some repairs and alterations, and th carpenters and upholsterers were at work there. Maria wa taking music lessons, and appealed to her teacher for advice the latter recommended a Muggins, and in the course of week or so the piano was bought and sent home. The teache was suddenly called out of town, and did not visit Muggin until ten or twelve days after the purchase. When he asked for his commission, Muggins told him it was already paid.

"To whom?" was the question, with emphasis of astonish ment.

"To Reps & Co., upholsterers."

"What right had they to it?"

"They came here next day after the piano was sent home, and said they were upholstering the house, and were consulted about a piano. They recommended mine as specially adapted to the house, and said it was bought through their influence. I paid them the commission. Since then the carpenters have been here, and now you make the third applicant. I am sorry it has happened so, but take a check for fifty dollars, and whenever you influence another sale, let me know at once."

The music teacher was badly sold, as it afterwards turned out that Reps & Co. did not know a word about the piano till they saw it in the house. Had he been as sharp as some others of his profession, he would have notified each of the piano makers, as soon as Maria broached the subject, that he was trying to sell his piano, and then, no matter whose make she selected, he would have obtained his honestly earned commission.

LXVI.

THE WIELICZKA SALT MINES.

THE GREAT WIELICZKA SALT MINES, THE LARGEST IN THE WORLD. — HISTORY. — EXTENT AND PRODUCT. — DESCENT INTO AND EXPLO OF THEM. — WHAT IS TO BE SEEN. — MINERS AT WORK BLINDFOL WONDERFUL CHAMBERS. — GLOOM CONVERTED INTO SPLENDOR. QUEYS IN THE BOWELS OF THE EARTH. — THE INFERNAL LAKE. — DEMONS. — AWFUL APPARITIONS. — EXTRAORDINARY NARRATIVES.

THE Wieliczka salt mines in Galicia, Austrian Polan probably the largest and most productive on the globe. are generally called the Cracow mines, though they ar miles from the ancient capital of Poland — perhaps be Wieliczka (pronounced *Vyalitchka*) is so much harder fo tongue to master. They are connected with the mine Bohemia,— this town is some eighteen miles east of Wieli — and extend over a space two miles long, and nearly mile broad, with a depth varying from six hundred to el hundred feet. The time of their discovery is unknown; it is held that salt was obtained from them in small quant as early as the eighth century. That they were worked in beginning of the twelfth century, when they belonge Poland, there can be no manner of doubt. Less than hundred years later, they had grown so productive, that simir the Great established rules respecting them. In they were ceded to Austria, and twenty-seven years recovered by John Sobieski. Austria again obtained po sion of them at the first dismemberment of Poland, and held them from 1772 to the present time, except for the years preceding 1815. They have been a great source wealth to the empire, and from them the Polish monarchs drawn their principal revenues. So important were they sidered, that, at each royal election, the Polish nobles st

lated that the salt of Wieliczka should be furnished to them at cost. The mines have never yielded so abundantly as at present; the annual product being, I have understood, about six hundred thousand tons, which, at ten dollars a ton — the usual market rate — creates a revenue of some six million dollars. As many as fourteen or fifteen hundred men, and as many as six or seven hundred horses, are generally employed in extracting the salt, which is found in lenticular masses inclined at a high angle. The salt varies very much in purity. Some of it, called *green salt*, has six or seven per cent. of clay; another kind (*spiza*) is mixed with sand, and the third and best sort (*szybik*) lies at the lower levels in unadulterated and beautifully transparent crystals. The Bohemian mines employ six or seven hundred workmen, and yield from two hundred to two hundred and fifty thousand tons of salt yearly. The figures I give, I obtained on the spot, and they may therefore be regarded as accurate.

A few years ago I made a special journey from Vienna, in order to go through the Wieliczka mines, in which I had felt a great interest ever since the geography of my boyish days had introduced me to their acquaintance. I had no trouble in procuring a ticket of admission at the Chateau of Wieliczka; and, well supplied with kreuzers for the workmen, I changed my clothes, and announced myself ready for the descent. There are ten or twelve shafts, but I asked to enter by the one the miners generally used. This is rather primitive, — material improvements having been made in some of the others, — or rather the means of descent are primitive. I was assigned to the charge of two miners, who were as stout, and hardy, and grim-looking as if they had toiled in the bowels of the earth — as no doubt they had — nearly all their lives. They were provided with torches, and they handed me one, at the same time showing me a place in the cap I had put on into which I could thrust the torch for convienence in carrying it. At the top of the shaft was a kind of windlass for letting us down, the construction of which I did not examine. A long vertical iron bar was in the centre of the shaft, and about this

bar was a steel ring, to which iron baskets or chairs wer fastened by chains.

In these we took our seats, our legs hanging down, whil we held to the chains above. At a given signal, the ste ring slipped along the bar, and we went smoothly and steadil down. The sensation very closely resembled that of descen ing a well. The darkness of the pit, which the feeble ligh of our torches made still darker, and the flickering shadow lent a certain gloomy picturesqueness to our perpendicula journey.

I might describe the anxiety and apprehension which I fel lest the chains should break, or I should be thrown out of my narrow seat into the great blackness below; but, as I did no have any such feeling, and as I question seriously if men of nerve or experience have it either, I will not try to render myself the hero of an imaginary situation.

I had supposed we should go to the lowest depths of the mines, but we stopped when we had descended four or five hundred feet, and got out. I learned then that the mines were full of wooden bridges and staircases by which the different levels were reached, and that by these communication was kept up with distant quarters. Some of the other shafts, as I was informed, are much deeper, requiring to be on a level with the galleries where the excavations are working. I had been taken down that particular one in order that I might see the entire arrangement and construction of the mines.

My guides were Poles; but I soon found that they spoke German, of which I had sufficient knowledge to ask ordinary questions, and understand the answers thereto. We set out on the second part of our journey, one of my conductors in front, and one behind; each of us carrying a torch in the left hand, at a forward point of elevation, so as to furnish as much light as possible. We threaded several passages which seemed to be veined with quartz, but which, on examination, I discovered to be the green salt. We went over bridges, down staircases, to the right and to the left, passing

various chambers and avenues, until my head became completely turned, and I could not have retraced my way to save my soul. I observed, however, that our general course was downward; and finally we arrived at a large chamber, represented to be seven hundred feet below the surface. This chamber had been abandoned because all the salt in the stratum had been obtained; but it had been arranged like a chapel, containing an altar, several crosses, and some images of saints, all made of rock salt. When the light of the torches was reflected on these natural objects, the effect was superb. The crystals glittered like diamonds, and only a little imagination was needed to transform the rude vault into an apartment of Aladdin's palace.

After I had sufficiently admired the chapel, we resumed our excursion over more bridges, down more steps, and through more passages, until we came to what the guides termed a river. It was not a very remarkable stream, reminding me, in its smallness, of the renowned Rubicon, or the Manzenares, when the latter does not happen to be altogether dry. Such as it was, however, we stepped into a rude little boat and crossed over, where we were soon on another bridge, and crawled down another staircase of the most rickety and tumble-down description.

I was surprised that we had met so few workmen, and mentioned my surprise to the stalwart fellows with me. They informed me that the part of the mine through which we had passed had been worked out, and that the miners had gone farther down, following the strata containing the salt. In half an hour or less, we encountered a number of miners hewing out a new passage. They were naked above the waist, and some of them wore the garb of southern savages, the high temperature rendering clothing uncomfortable, if not superfluous. They used picks and crowbars, and, in the beginning of their excavations, would lie down on their backs, and strike out the salt with their implements, covering their eyes with pieces of leather, to prevent injury from the failing fragments. It is not often that men can work well with

their eyes blinded, but there they succeeded better
seeing than with seeing. As they increased the
sufficient height, they stood up and labored in the
way.

There was now no lack of miners, who were vi
every hand, delving hard, steadily, and silently. Thei
excessively monotonous and severe. As most of the
done nothing else, and as they are densely ignorant, t
not tortured by brighter memories, nor haunted by pict
the possible. Their earnings are miserably small — no
I believe, on an average, than thirty to forty cents a d
working about twelve hours out of the twenty-four. O
these wages they usually have families to support; for i
true in Austria as in every other land, that extreme po
incites to marriage and prolific paternity.

The one so-called river which we had crossed was an i
duction to a number of others, all of them small, and more
pools than streams. The two workmen generally push
little boat over with poles, though they sometimes used
very much in the same fashion as the Lethe and the Sty
the Mammoth Cave are crossed. These pools or rivers
formed by percolations of water through the strata, an
them the miners have not unfrequently been drowned.

Our onward progress soon brought us to a large open s
— it must have been a hundred feet high, and nearly
hundred in length and breadth — called the Chambe
Letow; and about half a mile farther is another of still gr
dimensions, known as the Chamber of Michelawic. T
chambers, which were excavations, were decked out i
the splendor of rock salt. There were chairs, candlest
chandeliers, statues, thrones, columns, and altars comp
of the chief staple; and when lamps were lighted in
natural hall, the rays of light were reflected from thous
of points, and the whole interior shone in sparkling splen
It recalled to my mind the Crystal Saloon, as it is style
the New Palace at Potsdam, when it is illuminated on s
special occasion.

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TILDEN

I had brought with me from Cracow some small fireworks, such as red lights, serpents, and Catharine wheels, for the purpose of burning them in the mines; and this was evidently one of the places for their use. I handed some of them to the guides, and in a few seconds the cavern, more than eight hundred feet under ground, was ablaze with different colors, and showers of radiance. To produce a greater effect, all the lights were extinguished, and then another pyrotechnic exhibition began. The result was marvellous. One would have imagined that the moon, and stars, and sun, had all burst through the earth, that divided us from the upper air, and were gleaming and flashing under our very eyes. The rock salt was as so many prisms, revealing all the lines of the rainbow, and coruscating like a vault studded with jewels.

Such glorious radiance I had never witnessed under ground, nor had I deemed such radiance possible there. The extraordinary contrast between the pitchy darkness and the magnificence of the illumination can hardly be expressed in words. It was as a sudden plunge from a Memphian night into a tropical noon, and the first effect was almost blinding. I have witnessed, in my time, numberless exhibitions of fireworks on a grand scale, but none of them furnished so splendid a spectacle as the few pieces burned in the depths of Wieliczka. So much for accessories. Rock salt has its aesthetic as well as material uses; and, confronted with common lamps and common fireworks, it assumes the beauties of Dreamland and the shining glories which theological rhapsodists have associated with the Celestial Kingdom.

The Chamber of Michelawic is consecrated, I was told, to St. Anthony, and I think the saint would show his much boasted power, — not to speak of his kindness, — if he would relieve the poor devils who so implicitly believe in him from their need of wasting toil in those dreary caverns. On the 3d of every July, grand mass is celebrated in the chamber, — then regarded as a chapel, — and is followed by a banquet, in which the principal officials of Cracow and the directors of the mines participate. At that date the workmen are given a

horrid measures on empty space, I do not think I should have been surprised. Assuredly there could be no evil spirits anywhere if they were not there. Never could they find a more inviting region for the display of their malignity, or a more attractive rendezvous for the perfection of their schemes against the human kind.

A boat was ready for our embarkation upon the inky bosom of the lake, and we rowed out upon it with our gleaming torches, and our voices returning to us in the dreariest echoes. I was still thinking of the charms of the demons, when, of a sudden, the strongest and wildest sounds burst from the cavern. I strained my eyes, but in the thickness of the darkness I could descry no forms.

Groans, and shrieks, and horrid laughter rose, and reverberated through the vault, until — had I been the least superstitious — I should have become convinced that I had reached the Orthodox Tophet at last. The sounds were as weird as mysterious; but I concluded that it must be part of the exhibition, for which I was expected to pay at the usual rate, and I soon discovered that I was right.

It is the habit of the workmen, when strangers make a visit to the Infernal Lake, to go out in boats, distribute themselves at different points, and set up this diabolical yelling, that a proper impression may be made upon the visitors. That they acquitted themselves handsomely of their task I can testify; for a more discordant and abominable sound it has never been my fortune to hear.

The howls of the miners finally lessened in volume, — probably from exhaustion, — and I could distinguish, at the end of the wild refrain, the words "*Gluck Auf! Gluck Auf!*" (Welcome! Welcome!) There was something singularly sardonic in the idea of being welcomed to that dreary depth. Such a welcome the demons of the fabled Pit would extend, I should suppose, to the doomed and damned. The effect of the cheery words was more dispiriting than if they had been of evil omen.

While we were rowing grimly about on the lake, "*Gluck*

Auf assumed a fiery form in letters of flame, about a hundred feet in front of us. This seemed to be done by magic but a little reflection taught me that lamps must have been hung in the shape of an arch over a narrow part of the cave and that, while we were otherwise occupied, the workmen had lighted the lamps. The very moment the illumination was made, the harsh chorus began again, louder and more lugubrious than ever. I set off the last of my stock of fireworks, and amid the sulphurous blaze and the infernal din we floated back to the shore, when I was informed that the entertainment was over.

In a few minutes the chorus of demons appeared in the shape of hard-featured, muscular, ill-looking miners, asking for kreuzers, in consideration of the efficient aid they had lent to the depressing performance. As I have said, I was well supplied, and I could play the part of My Lord Bountiful with very little expense. Three or four kreuzers were enough to make the stolid faces of the miners brighten as if they had fallen into the possession of pecuniary independence. What they could purchase with such a trifle, I could not comprehend, for I felt that I should be no better off, in my own judgment, with fifty times the amount I had bestowed as gratuities upon the gnomes of Wieliczka.

My two guides denounced the begging unfortunates for their mercenary conduct in a vile Polish *patois*, which must have consisted chiefly of curses. I am sure they mentioned mercenary conduct, which must have been an ironical expression, since none of the wretches, in asking for *trinkgeld*, received, at the highest, more than four or five cents. The rebuke reminded me of the familiar instance of the parsimonious father who handed his boy a penny, accompanied by the precaution that he should not make a beast of himself, or of the over-thrifty husband, who, having been asked for a little money by his wife, wished to know what had become of the dollar and a half he had given her a month before.

The majority of the miners are Poles, unable either to read or write, to whom labor in the mines has been an inheritance

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SALT DIGGING.

IN THE WIELICZKA SALT MINES.

— their sole one, indeed. Many of them have never been five miles from home, nor do they expect to be. They are rooted to the spot by the necessity of toil and their narrow circumstances. Some of the workmen are Austrians, and they are usually more intelligent, or rather less ignorant, than the others. After a few years of service, they often leave Wieliczka, seek a larger field of labor and a better kind of employment. But the Poles, possessing a certain kind of stupid contentment, appear to have no ambition, and no future. I ascribe this partially to their loss of nationality, than which no greater calamity can befall a people. It robs them of their individuality, impairs their energy, and depreciates their self-esteem. They feel that they are deprived of what they have a right to enjoy, and that they are likely to be despised for a misfortune for which they are not directly responsible.

Nearly all the miners reveal in their features and expression the hard fate that has attended them. They have all the marks of undevelopment, all the traces of an animal and undisciplined nature. Mind, in the strict sense, is omitted in their composition. They are merely machines of flesh and blood, obeying physical instincts, and impelled by the law of self-preservation.

Years ago, the Austrian government used to condemn political prisoners to a term of service in the mines, sometimes extending through life; but of late this practice has been abandoned, and now all who work are regularly paid, and free to go or stay, as they like.

Going out of the mines, I followed almost the same course that I had coming in. Altogether I spent some six hours under ground, and might have spent weeks there, had I been inclined to exercise, since the combined length of its excavations and passages is said to exceed three hundred miles.

Accidents are uncommon in the mines, not averaging more than thirty a year, and few of these are fatal. They occur either from falls, or from being run over by the cars drawn to and fro by horses. These cars run on tracks from the place where the salt is dug out, to the mouth of the shaft, and

thence the salt is drawn up by machinery to the su
the earth. I had made my entrance through the pe
had been excavated and abandoned, that way havi
selected to give me a clear idea of the progress of th
and the gradual deepening of the mines. I observe
wards, at the lower levels, where hundreds of men w
tively employed, how the salt was thrown into the c
then carried by the railway to the principal shafts.

Wieliczka is impregnated with tales and traditions, r
and supernatural. Of the latter the peasants relate mar
believe them sincerely.

One of these is, that a miner, who had been sent to C
found, on his return, an image of the Virgin, which, as th
rative runs, had been stolen by the devil from the cat
of that city, and dropped by the wayside; St. Paul, or
other saint, having detected the theft, started in p
of the diabolical thief. A poor workman picked up t
age, which was of wood, and knowing it to be sacred, c
it back to the church in the midst of a storm. When h
reached the edifice, summoned the priest, and given
the holy man's hands, the inanimate image suddenly
with celestial light, sped through the air, and took its
tomed place at the altar. The awe-struck priest and p
fell upon their knees in prayer, and when the latter
there was an illuminated cross on his forehead. By i
tion he understood that whenever this symbol was vis
was to indicate good fortune; and going back to the min
cross proved to be very beneficial in pointing out the r
veins of salt. The man walked under ground, and whe
his forehead kindled with the divine token, it was a c
sign that the spot on which he stood would yield richly
received handsome presents, and numerous sums of r
from the government, and so excited the envy of his f
fellow-workmen, that they entered his cabin one nigh
knocked out his brains. His murderers disappeared m
ously the next day, and it was supposed, in the Galici
lage, that they were carried off by demons.

The image in the cathedral was heard to wail at the time the crime was committed, which was probably intended as a warning, though it did not do any good to the victim, at least in this world, however much it may have benefited him in the next.

I cannot see the moral of this monkish story, unless it be that persons who find things should not return them. If the miner had taken the image home, and split into kindling-wood, he might have lived much longer, and died peaceably in bed at a ripe old age.

During one of the periodic Polish revolutions in Warsaw, a prominent nobleman, resident in the city, and the leader of the insurrection, had volunteered to proceed to St. Petersburg, and assassinate the czar. The government spies detected the plot before it was mature, and went to the dwelling of the Polish conspirator to arrest him. He had been apprised of the discovery, and knowing that he would instantly be executed, he had been wise enough to flee from the town. He was sought for everywhere, for the authorities considered him extremely dangerous, and felt confident, from his character, that the emperor would not be safe while the desperate noble lived. All the subtle detective machinery of Russia was set in motion to hunt up the fugitive Pole, but all to no purpose; and the emissaries of the government, after a year of unexampled activity, abandoned further effort. Potzoporousky, the name of the arch rebel, feeling that he would not be secure anywhere on the surface of the continent, conceived the happy idea of going below it. He proceeded in disguise to Wieliczka, claimed to be a native of Vienna, and was hired as a miner, at thirty kreuzers a day. He labored most faithfully, and was considered an excellent workman, strangely preferring, as was thought, to remain in the mines, even when he might have been enjoying the sunlight. Nobody ever dreamed of looking for Potzoporousky a thousand feet under ground; and there he remained for fifteen months. Then he applied for his last week's pay, saying he had met with an injury that would prevent him from working for a lit-

tle while, hurried to Vienna, thence to Constantino finally to Smyrna. There he resumed his corresp with some of the former conspirators, and had per plan for a new revolution, when he was seized with and died.

During the latter part of the eighteenth century, tist of Radour was implicated in a conspiracy to defr Russian government of several millions of roubles by of forged army orders, and sentenced to ten years' e Siberia. He asked, as a special favor, that he mi sent, instead, to Wieliczka, where, he affirmed, his sc knowledge would be of use in separating the green sa the clay, with which the directors of the mines wer having considerable trouble. Prompted by interest, th ernment granted his request, and, the fifth day after l entered upon the service, he induced one of the superi ents to visit a new passage in process of excavation, c his skull with a lump of rock salt, put on his garment escaped. He had always been regarded as a purely in tual man, absorbed in his studies, and his deliberate tak another man's life only shows how sweet liberty is to us, and of what desperate deeds we may be guilty to the freedom we have lost.

From 1825 to 1851, one of the most vigorous and en miners was Johann Gerbreitz, a German, who, in all that t said never to have missed a single day's work. He was a favorite, on account of his kindness of heart and uniform temper, especially with the women of the village, who, er young or old, manifested a great deal of fondness fo When in his thirtieth year he married Elisa Dosbrinski, bler's daughter, regarded as one of the prettiest girls town. They lived together so very happily that they considered a model pair. They were never known to even those slight differences which are not uncommon most sympathetic and harmonious couples. They s wholly devoted to each other, and though Johann had something of a flirt before he became a Benedick, n

of the kind could be charged upon him afterwards. Everybody declared he was a manly and noble fellow, and that his serenity could not be ruffled.

In his fortieth year a fragment of rock fell upon him, and killed him instantly. His wife was wild with grief at her bereavement, and all her neighbors lamented, sorely too, because Johann was a loss to the village that could not be supplied. The children of Wieliczka had learned to look for his smile, and little acts of kindness, — he was a Rip Van Winkle of Austria, without Rip's infirmities, — and literally cried for him when he appeared in the streets.

After the poor fellow's corpse had been brought to the stricken home, it was discovered, to the amazement of the whole town, that Johann was a woman; and it is to be presumed that he had never been anything else. The secret of his sex had been most carefully preserved, and it would never have been thought, from any outward indication, that it had been shared even by his spouse. This is an excellent proof, if proof were wanting, that women can keep a secret, and that there are some things which even the busybodies of a village cannot find out. The story of the man-woman Johann Gerbreitz is still told at Wieliczka, along with many other curious histories, of which specimens have already been given.

Like the great capitals, the mining town of Galicia has its comedies and tragedies, its lyrics and its epics, perhaps trifling in themselves, but of wondrous moment in its too partial eyes.

LXVII.

EXPLOSIONS IN MINES.

THICKNESS OF COAL SEAMS. — STUPIDITY OF A TURKISH MINING SUPERINTENDENT. — THE RESULT. — BLASTING IN MINES. — HOW IT IS DONE. — TERRIBLE ACCIDENTS. — MINES ON FIRE. — SCENES OF DEVASTATION. — EFFECT OF SUBTERRANEAN FIRE. — EXPLOSIONS OF FIRE-DAMP. — HORRIBLE ACCIDENTS. — STORIES OF SURVIVORS. — LOSS OF LIFE. — SCÈNE IN A WELSH MINE. — EXPLOSIONS IN ENGLISH AND AMERICAN MINES. — MODES OF RELIEF. — STORY OF TWO BROTHERS. — HOW THEY WERE SAVED. — THE SAFETY-LAMP. — ITS CONSTRUCTION. — THE FIRE-WALLS OF CHINA. — THE PENITENT AND CANNONEER.

AFTER the shafts have been completed and the levels opened in the mines, the work may be said to be fairly under way. The seams of coal are of varied thickness. Sometimes, though rarely, there will be found a coal seam of thirty feet in depth, sometimes one of twenty, and so on down to two and three feet. A seam of three feet in thickness is considered a valuable discovery, and oftentimes the seams do not exceed twenty inches. In the deep coal seams the work is comparatively easy, as the space in the level can be hollowed out the full depth of the seam, and all that is necessary for supporting the roof is to leave a sufficient number of pillars standing.

There is a coal mine in Turkey where the seam is about ten feet thick. A superintendent, entirely ignorant of the business, was sent to take charge of the mine. On his first visit to the mine the men were below. He observed the pillars which were left to support the roof above. He gave one glance at them, and then turned to the workmen and said,— "Remove those blocks of coal instantly: this mine has not been worked properly."

With that blind obedience peculiar to the Orientals, the

men immediately knocked away the pillars, when down came the rock, killing half the men in the mine, and among them the stupid superintendent, who had ordered the removal of the supports.

There are many dangers and difficulties to be encountered in opening a coal seam. The ordinary mode is to dig away the coal from the lower part of the seam, and allow the substance to fall down in large blocks. To perform this work the miner must lie on his side, frequently in a hot temperature, and in this position he digs away with his tools. It is not unusual for the coal to fall upon him, sometimes injuring him seriously, and sometimes killing him. In his work the miner is frequently stripped to his trousers and shoes, and sometimes he works entirely nude. The perspiration streams from his face and from his entire body, and he is unable to continue his labors for any extended period of time.

Sometimes the coal can be removed by means of tools, without the necessity of blasting, but very often it is necessary to employ the force of gunpowder. The rock is drilled, and then the charge must be placed in the hole. There is always more or less danger of premature ignition of a charge, and in consequence of such ignition, men are frequently killed.

The most dangerous place for blasting operations is in the shaft. The men can only retire after the charge is lighted, and when this is done it is imperatively necessary that they should be drawn up with all speed.

One day, at a mine in Pennsylvania where a shaft was being sunk, the men had lighted the fuse and given the signal to be drawn up. Somehow, just as the bucket was started, some of the machinery gave way, and the men remained at the bottom of the shaft. The fuse was slowly but steadily burning, and there was no time to be lost. One of the men jumped from the bucket and cut off the fuse when it had burned to such a point that another moment would have rendered the explosion inevitable.

A safer way than using the ordinary fuse, is to fire the

charges by means of electricity. This method, however, is not always practicable, owing to the expense and the difficulty of employing it in small operations.

Nitro-glycerine, which was invented in 1847, has been found to possess many advantages over gunpowder, and the day is not far distant when it will be used for all blasting operations on an extensive scale.

The firing of gunpowder and nitro-glycerine is not the only source of danger which threatens the miners by fire. There is frequently in coal mines a spontaneous combustion, produced by the heating of fragments of coal from the decomposition of iron pyrites in contact with moisture. When the small coal of certain mines is left in heaps within the mines, they speedily undergo this decomposition, especially in a moist atmosphere, which is accompanied by a great development of heat.

In such cases walls of clay are built up to shut off the fire. When these are constructed perfectly tight, and the atmosphere is carefully excluded, the fire goes out; but for some time the temperature in these parts of the mine will be very great, and the miners find much difficulty in working there. The work of building up the walls in such a case is very serious. The walls become very hot, and men are frequently rendered insensible. Sometimes carbonic acid gas has been used to extinguish fires created in this way. The portable apparatus known as the Fire Extinguisher has frequently been found very useful.

Sometimes, however, it is impossible to extinguish these fires; and in such cases the place is abandoned. In this country, and in England and Scotland, there are mines now burning which have been on fire for several, and some of them for many, years. One mine in Scotland took fire nearly forty years ago, and is still burning. The ground is black, baked, and scorched. The trees, and grass, and all kinds of vegetation have died, and there is a general appearance of sterility throughout the region.

In several instances, where a fire cannot be extinguished by

closing the mines, it has been found useful to flood the works. In France, about twenty years ago, an entire river was turned into a burning mine, and allowed to flow through it for nearly three months. A mine in Pennsylvania took fire, and was filled with water, remaining so filled for nearly half a year before the fire went out.

At Brulé, St. Etienne, there is a coal mine which has been on fire nearly two hundred years. Hot vapors are constantly arising; sulphur, alum, and other natural productions are deposited, and one might suppose that it was the burning of the accursed cities formerly consumed by the fires of heaven and earth. An irreverent American, who visited this region, said that it looked like hell with the fires going out.

In the western part of England there was formerly a coal mine on fire. Snow melted as soon as it touched the ground. The gardens were very beautiful and fertile, and produced three crops in a year. Many hot-house plants were cultivated, and an eternal spring prevailed. It was the same principle, on a grand scale, by which plants are grown in hot-houses by running pipes of hot water through the ground. The people of this region imported tropical plants at a heavy cost, and cultivated them in the open air; but one day the fire went out; the place gradually resumed its usual temperature, and the tropical plants died.

In many coal mines there is great danger from what the miners call "fire-damp" — an inflammable gas produced from the coal. It is identical with the streams of natural gas, which burn readily, and not unlike the coal gas artificially produced in cities. Certain kinds of coal throw off this fire-damp in considerable quantities. The gas is a combination of hydrogen and carbon. Sometimes its presence is not noticed until an explosion, but in such cases the explosions are not very dangerous. Those who have been accustomed to this explosive material have received a vivid experience of underground life. No meteor, however terrible it may be supposed to be, can be compared to an explosion of fire-damp. A thunderbolt, a hurricane, a typhoon, a cyclone, or a

whirlwind, is not more terrible in its effects than a fire-dam explosion. Imagine a discharge of a hundred cannon loade with canister shot, the simultaneous explosion of a number o powder magazines, or the bursting of the boilers of a steam engine, and the effect will not be more terrible than an ex plosion of fire-damp in a coal mine.

The moment the gas comes in contact with the flame of a lamp, its tremendous explosive force is revealed, and it pene trates into every quarter of the mine. In an explosion of this kind everything is shattered far and near. Horses, men doors, machinery, and everything else lying in its course is overthrown, and sometimes heavy machinery at the top of the mine is blown away. Dense clouds of smoke, and frequently masses of coal, stone, and timber, are sent flying from the shaft high into the air. The very ground shakes as if moved by an earthquake, and the general appearance of the shaft is not unlike that of a volcano in a state of eruption. Streams of water are sent into the air, and not a pane of glass for a long distance around remains unbroken; and to these horrors must be added the great confusion and alarm of the people, the wailing of the women and children whose nearest friends have perished, and even then the terrible picture is incomplete.

The stories of these explosions would fill volumes. In one mine three hundred and sixty men at one time were killed, in another two hundred, in another one hundred, in another fifty, in another twenty, in another sixty, eighty, and so on, through mine after mine, till the deaths from fire-damp could be numbered by thousands. Not those alone who are in the wreck of the explosion are the victims.

At a Pennsylvania mine a few years ago, a dozen men were at work in one of the galleries, and heard an explosion in a portion of the mine some distance away. They rushed to the shaft, and attempted to escape. Before the bucket was lowered to remove them, the choke-damp, developed by the explosion, overtook them, and the whole party were suffocated. Hundreds of stories might be related of explosions in coal mines. One of them will be sufficient for the present.

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At one time, in one of the English mines, forty men were at work. At the mouth of the shaft there were a dozen or twenty men, when suddenly there was a loud report, like an explosion. It was at first supposed to be the bursting of the boiler; but a moment's observation showed that the fire-damp had become ignited. The masonry at the mouth of the mine, and all the machinery above it, were blown away. At the moment of the explosion, a tub filled with coal was being hoisted up. It was a hundred feet or more from the surface, and it was blown into the air as if it were a bullet fired from a gun. The fragments fell around the mouth of the shaft, injuring several of the men who were there.

When an explosion occurs, the miners, and all attached to the establishment who may be above ground at the time, are ready to go to the relief of their comrades. In the present instance a relief party was organized at once. A pulley was rigged over the mouth of the shaft, and two men entered a bucket to be lowered down. They had not descended fifty feet before their lights were extinguished, and very soon they made a signal to be drawn to the surface, both of them being in a condition bordering on suffocation. They were ill through the night, and one of them did not recover his strength for several days. A second attempt was made, and resulted in nearly the same way. The lights were extinguished, and the men drawn up in a suffocating condition. The galleries seemed to be full of choke-damp, and it was almost certain that no one could be alive in the mine. A hose was lowered, and pure air was pumped into the mine. This work lasted three or four hours, and then two others descended and succeeded in reaching the bodies of some of their companions; but in the attempt one of the rescuers fell dead, and the other was nearly suffocated.

More air was poured into the mine, and it was then twenty-four hours from the time of the explosion before the explorers thought it safe to enter. Every man who was below at the time of the explosion was killed. At the stables near the foot of the shaft a horrible scene was presented. According

to the indications, three of the men were in the stables, taking care of the horses, at the moment of the explosion. The stables were thrown down, the men and horses were covered with the fallen debris, and death by suffocation seemed to have ensued in a very short time.

At the end of the gallery, where the explosion had taken place, the bodies of the men were found in some cases hardly scorched, while in others every particle of clothing had been burned away. In some instances the bodies were so baked that they could not be recognized.

Around the mouth of the pit the families of the miners were congregated. As each body was brought to the surface, there were shrieks and loud lamentations that could be heard for a long distance. A more terrible sight cannot be seen in the whole world, than at the mouth of a mine shaft after an accident of this kind.

A story is told of an explosion, in one of the Welsh mining districts, which caused the death of forty-seven men. Only two men that were below at the time escaped with their lives. These men were brothers. When the explosion was heard, one of the brothers rushed towards the other, who was a short distance away. A second explosion followed, more severe than the first, and threw the men down. Both were stunned, but they gradually recovered their senses, and were able to move. The air was thick and hot, and they could only move with great difficulty. The older brother had his can of tea, and bathed their faces with the liquid, so that they revived. Supporting each other, they tried to reach the entrance to the mine. They crawled on their hands and knees in the midst of darkness, over the bodies of their late companions, some of whom were still breathing, while the rest were silent and dead. After many narrow escapes, they reached the end of the gallery, near the shaft, and were saved.

An apparatus has been invented by which a man can enter places filled with choke-damp, either to carry aid to suffering men after an explosion, or to make explorations. A bag, or case of leather, or metal, is carried on the back, into which

air has been driven under a heavy pressure. A rubber tube extends from the bag, and is fastened to the mouth and nose. It is furnished with two valves, one opening inward, to carry the air to the lungs, and the other outward, to carry off the air after it has been breathed. For long journeys extra bags filled with air may be taken. Some of these reservoirs, made of sheet iron, will resist a pressure of thirty or forty atmospheres. Another apparatus, fastened to the back, like a soldier's knapsack, has a kind of valve, placed above the reservoir, allowing the air to enter the lungs at the ordinary pressure only.

A similar apparatus is made by filling an air-tight goat-skin with air. The same kind of tubes are employed, and sufficient air can be carried to last the bearer fifteen or twenty minutes.

To guard against gas explosions, Sir Humphry Davy invented a safety lamp. He protected the flame with wire gauze, on the principle that flame cannot be made to pass through a tube, however short, unless it is driven through. The wire gauze is in fact a number of short tubes close together, and thus, while the explosive gas may pass through, the flame cannot do so.

An improved lamp of this class has a glass cylinder around the flame, with gauze at the top and below. The glass is protected by stout wires. A great many forms of these lamps are in use in mines, but all are constructed on the same principle. By the use of this safety lamp, many mines that had been abandoned were reopened; and Sir Humphry Davy is regarded as one of the greatest benefactors of this age. His lamp might well be called, like Aladdin's, the Wonderful Lamp.

Sometimes, when fire-damp is very abundant, and is steadily given out, it is utilized for lighting purposes: the gas is collected, and by means of a pump a jet of gas is poured from a tube and is ignited. One of these jets has been burning for more than twenty years in an English coal mine. In the same mine the gas was collected in pipes, and carried outside, where it was used to run a steam engine.

A French traveller has given a vivid description of the famous fire-wells of China. He says that where the air escapes it is very inflammable, and if a match is presented at the mouth of the shaft, the gas explodes like gunpowder, and forms a great column of fire twenty or thirty feet high.

He says the largest fire-wells are situated in the mountains about one hundred miles from Wutung. They are in a valley, where pits were sunk in the hope of finding salt water. The water was not found; but suddenly a column of gas rushed out, bringing masses of earth and stones. The noise was terrific, and was heard a long distance. The mouth of the pit was surrounded by a stone wall six or seven feet high. As soon as the fire reached the mouth of the well it caused a terrible explosion, something like an earthquake. The flame was several feet high, and the force was sufficient to throw down some of the stones composing the wall. Several men carried a large flat stone to the pit, and placed it over the mouth. It was immediately thrown into the air, and some of the men were badly injured.

Neither water, stone, nor earth would extinguish the fire. After two weeks of hard work a quantity of water was brought over the mountains from a small river, and a lake was formed. The water being suddenly turned into the well, the fire was extinguished.

In some mines it is the custom, where the accumulation of fire-damp is gradual, to light it every night, so that the works may be always accessible in the daytime. The man whose duty it is to light the fire-damp wraps himself in a thick blanket, covering his face with a mask, and with his head enveloped in a hood like a monk's. The fire-damp is lighter than the atmosphere, and always rises to the upper part of the level. Consequently the man crawls upon the ground in order to put himself in the best position for breathing. In one hand he holds a long stick, with a lighted candle fixed at the end.

He pushes the stick to its full length, and creeps along, firing the gas; and as soon as he has fired it he changes his position, and walks upright, since the fire-damp is always fol-

lowed by the choke-damp, which is heavier than air, and sinks to the bottom.

In the French mine this man is called a *penitent*, on account of his dress resembling that worn by some of the orders of the Catholic church. His name sometimes would seem to be a cruel jest, as he is liable to be blown away by an explosion, and never return alive. In other mines he is called the *cannoneer*, and when the fire-damp kills him he is said to have died at his post.

LXVIII.

MYSTERIES OF THE GRAND JURY.

SITTING ON A GRAND JURY. — HOW IT IS COMPOSED. — PECULIARITIES OF MODERN JUSTICE. — HOW TO SELECT BLOCKHEADS. — A DISHONEST BAGGAGE-MAN. — CHARITY AND MERCY. — AN AFFECTING INCIDENT. — SAVING A YOUTHFUL OFFENDER. — A GENEROUS WOMAN. — CURIOUS PHASES OF HUMAN NATURE. — CELT AND AFRICAN. — STORIES OF THE DETECTIVES. — A GARRULOUS IRISH WOMAN. — FAMILY TROUBLES. — THE HORSE AND CART STORY. — HOW A PRETTY WOMAN CAPTURED THE JURY.

It was the fortune or misfortune of the writer to be called to sit on the grand jury of the Court of General Sessions in New York, in the latter part of the year 1871. Like most of my fellow-men, I had no great fondness for jury duty, and made efforts to be released. I was politely informed that there was no escape, and that I had better do cheerfully what I could not avoid. And so I did it. I sat on that jury, or rather in a cane-seated chair in the jury-room, for fifty-eight days, some of them pretty long ones. It was my first experience of the sort, and I learned more about criminal matters than I had ever known before. A man who sits a month or two on a grand jury can have a reasonable excuse for accepting the doctrine of the total depravity of the human race, or, at all events, of a considerable portion of it.

What is the difference between a grand jury and a petit jury? To many persons, and probably to most, this question would be an insoluble riddle. Everybody who knows anything worth mentioning is aware that a petit jury, in a criminal court, consists of twelve men, who are sworn to well and truly judge of the guilt or innocence of the accused tried before them. They are to weigh the evidence given in open court in presence of the accused, and when they agree upon

a verdict, and are ready to return it, they stand and look upon the prisoner, who is instructed to stand and look upon them. To find a verdict, the twelve must be agreed; and thus it often happens that an obstinate man can "hang the jury," and prevent the rendition of a verdict. Obstinacy may arise from various causes and motives, generally honest, but not always so. Sometimes the jury is equally divided in opinion — six men being of one mind, and six of another; sometimes a verdict is the result of a compromise, which includes a recommendation to mercy, or a verdict for a lower degree of criminality than is charged in the indictment. In civil suits, where a question of damages or compensation arises, the result is often obtained by taking the figures proposed by each man, adding them together, and dividing the amount by twelve. But in criminal cases no such system of average can be employed. Very often the persistence of a single juror will save an offender from immediate punishment, and allow him a new trial — which frequently means no new trial, but a discharge on his own recognizance. And sometimes the obstinate juror attributes to his comrades the inability to find a verdict. The story of a western juror is frequently used to point a moral or adorn a tale. "I was all right," he says, "and we might have settled the thing straight off, if the other eleven hadn't been the most pig-headed fellows you ever saw."

One requirement of the practice in our courts is, that in a criminal case no member of a petit jury shall have formed an opinion as to the guilt or innocence of the accused. In cases that have not acquired notoriety, this does not materially interfere with the selection of a jury; but in a case that has attracted general attention, like that of Foster, or the assassins of President Lincoln, several days may be spent in finding twelve men without opinions. The rule was adopted long ago, when there was no general diffusion of knowledge, and when there was no daily chronicle of events accessible to everybody. On a matter of great importance and general newspaper discussion, it is next to impossible in these days that an intelligent man should have no knowledge or opinion;

to demand an opinionless jury in such a case is practically to demand a jury of blockheads. It may well be doubted whether, in this country of electric telegraphs and lightning presses, the old practice is the best. The object of trials by jury is to protect the innocent and punish the guilty. I think I utter the sentiment of most thinking men, in saying that for my part I would rather, if wrongfully accused of a crime, be tried before twelve honest, intelligent men, who believed me guilty, but whose opinion could be changed by evidence, than before twelve ignorant men who had formed no opinion about me. But if I were guilty, and desired, as most criminals desire, to escape justice, I should clamor for a jury of such of my fellow-men as could not entertain an idea without having it thrust into their heads with an auger. Many a scoundrel has evaded his just deserts by means of a jury of "twelve good men and true," whose intellects were hardly equal to those of an educated horse.

But a grand jury encounters none of the difficulties that beset a petit jury. The law requires that it shall be composed of "intelligent citizens of good character," who shall be qualified to serve as, and not exempt as, petit jurors. Their names are selected by lot, the same as employed for the selection of petit jurors, and each man selected is notified by the sheriff of the county. A grand jury is composed of sixteen as the minimum, and twenty-three as the maximum number. Twelve must concur to find a bill or to dismiss a complaint. No vote can be taken unless there are sixteen grand jurors present; whether there are sixteen or twenty-three present, or any number between the minimum and maximum, there must be, as before stated, twelve to concur in determining the ordering or rejection of an indictment. Other votes, such as for adjournment and the like, are taken by majorities, in the same way as in other deliberative bodies. The accused never appears before the grand jury, and only one witness can be called into the room at the same time. The district attorney may be present during an examination, and at the request of the foreman may conduct it, but he cannot be present when a vote is being taken.

The grand jury is of Saxon origin, and its existence may be traced as far back as the tenth century. Its object is one of inquiry rather than of trial, and for this reason it is frequently called a "grand inquest." Under the old practice the grand jury originated inquiry without the intervention of any public officer, and any citizen was at liberty to appear before it, state his own wrongs or the offences of others, or make complaints against public evils of any kind. It partook of the nature of a legislature or common council, to which any citizen may submit a petition. Any member of the grand jury who happened to know or learn of an infraction of the law could lay the matter before his associates for their action. I am informed by good legal authority that this is still the practice in England and in parts of the United States. But the practice of New York, so far as the city is concerned, has of late been for the grand jury to consider nothing that was not submitted to it by the district attorney, and for that official to submit nothing that had not reached him from a committing magistrate. There is both good and evil in the practice, and on the whole, much more evil than good. A great many offenders have gone unwhipped of justice in consequence of this system. Men who have just cause of complaint against other men high in power have sought in vain to bring their cases before a committing magistrate, for the reason that the latter was the friend or dependant of the accused, and would use his official position to protect him.

Several cases of this kind were brought to my notice while I was sitting on the grand jury. For example, a man one day came to me with a request that I would bring to the notice of the grand jury a certain case which he explained. I asked him why he did not go before a committing magistrate with it. "Why," he replied, "because the committing magistrates are all friends of this man, and would do anything he wants. He can get any kind of 'justice' he desires, and nobody can do anything against him." I am satisfied that his opinion of police magistrates in New York city was not altogether baseless, and, if I am not mistaken, other testimony could be found

to the same effect. With the reputation or lack of it that be longs to our local judiciary, it is eminently necessary that al grand juries should be clothed with the power that make them grand in quests, and enables them to investigate any charge of wrong-doing without waiting for its submission by a police magistrate. I am satisfied that there are many scoundrels whose career of wickedness would be materially curtailed if they knew there was full opportunity for their accusers to go before a grand jury and furnish the proper information for a criminal indictment.

The testimony before a grand jury is of an *ex parte* character. Blackstone says, "They are only to hear evidence on behalf of the prosecution. For the finding of an indictment is only in the nature of an inquiry or accusation, which is afterwards to be tried and determined; and the grand jury are only to inquire upon their oaths whether there be sufficient cause to call upon the party to answer it. A grand jury, however, ought to be thoroughly persuaded of the truth of an indictment, so far as their evidence goes, and not to rest satisfied with remote probabilities — a doctrine that might be applied to very oppressive purposes." The petit jury gives the accused the opportunity to sift the *ex parte* evidence on which he has been indicted, and of explaining or contradicting it. The general rule for the guidance of a grand jury is, that they must be as well satisfied of the guilt of the accused, in order to find an indictment, as they would be to convict as petit jurors in case none of the evidence before them was explained or contradicted. It often happens that complaints are presented of an avaricious or malicious nature, or with some other motive than the proper enforcement of the law. Such cases require careful inquiry and cautious action.

Early in the session of the grand jury of which I was an integral part, a complaint was made against a baggage agent of a steamboat company for taking money for extra baggage, and neglecting to pay it over to the authorized agent of the company. At its commencement the case appeared reasonably clear, but a suspicion arose that the complaint was malicious,

and more evidence was called for. Each additional witness confirmed the suspicion, and it finally came out that the principal accuser had long desired the situation of the accused, and had been appointed to it after the removal of the latter. Here was a motive in which malice and avarice were evidently the principal elements, and when the matter was put to a vote the jury promptly dismissed the bill. The testimony of the complainant was not fully sustained by that of the other witnesses; and even had there been no display of malice, the evidence was not sufficient to secure conviction before a petit jury.

I wish to remark, *en passant*, that where I mention cases that were before us, without giving names and localities, I shall purposely, in most instances, change the story in such a way that the outside public cannot trace it, even with a careful research into the records of the police or other courts. My brother jurors will recognize each case described, but the veil of secrecy thrown around the grand jury room will not permit me to be rigidly precise. Great injustice might be done, in many instances, by a complete revelation, and therefore the reader must be left in the dark to a certain extent. He may look upon the cases I give him as exact parallels, and nothing more. When I say a man was charged with stealing a horse, you may know that he was charged with stealing something, but whether horse, cow, or cooking-stove, it is not necessary to explain in describing the work of the jury. And with this apology for harmless but very necessary fiction, I proceed.

It is not at all times proper to dismiss a complaint when caused by malice. One day a man came before us, who swore that another man had swindled a large establishment out of considerable money; he did not make the complaint on behalf of the parties defrauded, but in the interests of justice. His malice was evident; he made no attempt at concealing it; but he sustained his testimony with documentary evidence and the sworn statements of other witnesses. The jury doubted about the propriety of ordering an indictment

under the circumstances; some of them argued, that had no quarrel occurred between the parties, the case would have slumbered, and therefore the complaint should be dismissed. There was such a divergence of opinion that the district attorney was called to tell us what to do. We explained, through our foreman, the nature of the case. The district attorney, who is at all times the legal adviser and instructor of the grand jury, listened, and then said, substantially, —

"Where you find that a complainant is acting through malicious motives, and there are no other witnesses, or, if any, that they do not substantiate the complaint, you had better dismiss it. But where the complaint, however maliciously made, is shown by other evidence than that of the complainant to be true, you must order an indictment."

And consequently we ordered an indictment against the alleged swindler.

Not many days after we were convened, a case that touched the heart of every man in the room was brought before us. A young girl had been accused of theft; a few dollars in money had been stolen; it was found in her possession, and she had made partial confession. The complainant was a woman, and the accused had been in her employ. When the case was called, the woman entered the jury-room, and was sworn by the foreman. She took the chair assigned to witnesses, and the foreman questioned her.

"Did you lose some money?"

"Yes, sir."

"When did you lose it?"

"On the first day of December?"

"Who took it?"

"The girl named in the complaint."

"How do you know she took it?"

"I found it in her possession, and she confessed taking it."

"That will do; you can go."

But the woman kept her seat, and moved her hands uneasily. "You can go," said the foreman again; but she

did not start. A juror sitting near the door rose to show her out, and as he did so the woman said, —

"I do not wish to press the complaint. I want to withdraw it, and have the girl released."

"Why so?" asked the foreman.

"Because,"—and her voice began to choke,—"because the girl is young, and I do not wish to ruin her. Somebody else urged her to steal the money, and I think she will do better in future. If I send her to prison she may become a professional thief, but if I give her a chance she will be a good girl. She is an orphan and has no friends, and I want to be her friend. I know she is guilty, but I want to be merciful, and I beg you to be merciful, gentlemen."

Half her utterance was drowned with tears, which flowed rapidly down her face. The foreman told her to step outside and he would call her again in a few moments, and inform her of the result of her eloquent appeal. "Be merciful, gentlemen," were her last words as she closed the door.

It was voted to dismiss the complaint; and when the foreman called her to the room, told her of the result of the vote, and commended her for her kindness of heart, her tears flowed afresh, and she thanked us through broken sobs. I know that in that room more eyes than hers were wet — eyes not accustomed to tears.

But soon a discussion arose as to the propriety of our action. When the grand jury was impanelled, the following oath was administered to the foreman: —

"You —— ——, as foreman of this grand inquest, shall diligently inquire, and true presentment make, of all such matters and things as shall be given you in charge; the counsel for the people of this state, your fellows, and your own, you shall keep secret; you shall present no one from envy, hatred, or malice; nor shall you leave any one unpresented through fear, favor, affection, or hope of reward; but you shall present all things truly as they come to your knowledge, according to your understanding. So help you God!"

And to the other members the following oath was administered: —

"The same oath which your foreman has taken on his part, you, and each of you, shall well and truly observe and keep on your part. So help you God!"

Some of the jurors thought we had no right, under our oath, to show favor, no matter how strong might be the appeal to our sympathies. Every man in the room wished to be lenient, but at the same time, above all other things, wished to do his duty. The discussion resulted in our sending for the district attorney and asking his advice.

After hearing the case, he said there was a difference of opinion as to the power of a grand jury. "You can undoubtedly," he continued, "exercise your discretion in certain cases, and act as you think is for the best interests of society. It is both right and proper that the grand jury, and also the district attorney, should be clothed with a discretionary power, as it frequently happens that they can do more good by exercising it than by following the strict letter of the law. I will give you an illustration: Some years ago, the case of a young man charged with embezzlement was placed in my hands to prosecute. His employer was determined to push the case; he was rather ugly about it, and there seemed no other course than to prosecute. The young man was out on bail, and came to me to beg to be let off. He said he was guilty, and should so plead; that he had an invalid sister, and with the utmost economy on his small salary he was unable to support himself. He knew that this was no excuse for his theft, but he took the money under great temptation, and did not realize the enormity of his offence until after he had committed it. 'You can send me to the penitentiary,' he said, 'and nobody can blame you; but you will ruin me for life, and bring disgrace upon my parents and sister, who do not know that I am charged with crime. If I can be released and the matter hushed up, I will faithfully promise to do better in future, and I think this will be a life-long lesson to me.' He pleaded so earnestly that I promised to do what I could for

him. I sent for his accuser, and urged him to withdraw the charge. At first he refused, but I laid the case before him in such a light that he at last consented. And I then urged him to take the young man back and give him a new trial, and after much talk I succeeded. The complaint was withdrawn, the young man was restored to his position; in a little time his salary was increased; by and by the firm dissolved in consequence of the death of one of its members; the young man went to another house, proved himself worthy of confidence, and to-day he is a member of that house, and as honorable and upright as any business man in New York. He has never forgotten, and never will forget, that lesson. If he had gone to the penitentiary, his worst fears would have been realized. When an offender is young, the offence is a first one, and the offender appears penitent, it is entirely proper for you to exercise leniency by dismissing the complaint; and in the case now before you, gentlemen, you have been entirely right in your action."

As the district attorney ended his remarks, there was a round of applause, in which I am very certain every member of the jury participated. Those who had been most doubtful of the propriety of our action were heartily glad that their doubts were not well founded.

During our session there were several cases in which the accusers wished to withdraw the complaints. Where the reason for the withdrawal was the youth and penitence of the accused, the request was generally granted. In one case a family quarrel had gone before a magistrate while the temper of all parties concerned was at fever-heat; passion had subsided in the time required to bring the case to the grand jury, and the complainant was anxious to make terms of peace with his antagonist. There was another pleasant little affair, in which a nose had been bitten off in a discussion that evidently had whiskey in it. The biter was the cousin of the bitten, and on account of the relationship the latter wished to be mild. His cousin was not a professional biter, and should he go to prison it would not restore the central ornament of the

complainant's face. The offender had promised n
again; and besides, he had not bitten off much o
any way. The appeal was heard, and the complai
the mordacious relative was dismissed. As he h
month in prison, it is to be hoped that he took sol
ing, and will hereafter confine his dental exercise t
nary articles of diet.

In some instances the complainant wished to wit
charge, for the reason that he had already lost time
the prosecution, and did not wish to lose more. S
in cases of robbery, the friends of the accused had
restore the stolen property on condition that there
no prosecution and very naturally the complainant
ing to make such a compromise. But it was out of
to do so after having once made his complaint b
magistrate, and his appeal to the grand jury was
of no avail. The well-being of society, in cases
sional thieves and the like, was held to be paramo
desires of complainants, and if the testimony was c
was no delay in ordering indictments. In one insta
who had been robbed, in a house whose character w
all doubtful, asked to withdraw the complaint becau
already lost too much time in following it. He did
the accused was either young or penitent, but he
afford the time he was devoting to the case. H
dently been instructed what to do, as his testimony b
grand jury was quite different from that in his
sworn to before the magistrate. In his complaint h
knew that the prisoner took the money, but wh
presence he was uncertain on the subject. He did
couldn't tell, didn't remember, was excited at the
so on, until we found that he was determined to say
nothing. As there were no other witnesses, we we
to dismiss the charge, though morally convinced of
of the accused. The complainant had determined to
case abandoned, and as the prejudices of the n
century are opposed to the use of the rack and thum

in the grand jury room, we had no means of compelling the witness to adhere to his original story. Mind you, he had not varied it so as to make him liable to the charge of perjury, in one case or the other; he had only substituted uncertainty for certainty.

Another instance of the withdrawal of a complaint through motives of kindness, was in the case of a woman who had lost a few articles from her room while her door was left open. The thieves were some young boys, whose parents were respectable; and as soon as the theft was traced to the culprits, the property was at once returned. "I don't want to make felons of them," said the woman; "I think they took the things out of a spirit of mischief, and that they will be good boys in future. The mother of one of them has talked to me about it, and I have promised to withdraw the charge." Her appeal was earnest, and before its close it was eloquent. When she left the room it was voted to dismiss the case. The foreman then sent for her, told her that she had displayed much kindness of heart, that the jury appreciated her motives, and had complied with her request. Her thanks, like those of the woman mentioned heretofore, were given through tears, and she rushed outside to congratulate the anxious mother of the boy whom she had released.

Many phases of human nature can be studied in the grand jury room. The hatred which the natives of green Erin bear towards our citizens of African descent is frequently seen where the accused is of negro blood, and the witness is of the race that boasts the Blarney Stone, and grows indignant at mention of Boyne water. Given such a case, and the chances are more than even that the witness will tell a story in which indictment is the primary, and truth the secondary consideration. If you have two or more witnesses of the loquacious nationality, and take the pains to question them closely, you will be likely to find a conspicuous inharmony in their testimony. They seem to consider themselves called to "swear agin' the nagur," and they generally do it. And it is possible that, with the case reversed, — an accused Celt and a testify-

ing Ethiopian,—the evidence might be equally
But, for some reason, we did not have a fair opp
settle this momentous question, and I must theref
for the consideration of some grand jury of the fut

The detective officer shines brilliantly before
jury. There was, now and then, a man of this pro
was quiet and unpretending, but he formed an ex
the rule. The detective had generally done wonde
in the discovery of crimes already committed, or
vention of crimes contemplated or progressing. S
tives told their stories with admirable directness, w
were evidently desirous of giving condensed histor
professional careers. "Did you arrest John Jones
foreman when a detective is called in. "Yes, s
reply. "Why did you arrest him?" "Because
had robbed Brown's store." "Did you find anyt
possession?" "Yes, sir." "What did you find
articles named in the complaint." "That will do, c
can go;" and the officer bows, and departs.

This is all that the jury wants to know from ths
regard to the performance of John Jones, who is
on complaint of Brown, with burglary in the fir
But the probabilities are two to one that when th
asks, "Did you arrest John Jones?" the officer wi
was walking along Broadway, and saw Brown, who
if he had been robbed. I went to his store, and saw
of a chisel near the lock, and asked Brown if he ha
thing. Brown told me he had, but did not know
robbed him. I looked at the chisel-mark, and thou
Jones's work. Then I went down Canal Street, and
standing talking with two men, one of whom I rec
seeing seven years ago at the California State Priso
took the great stage-robber Smith up there for rol
Petaluma mail, and frightening a lady passenger sc
died next week, and left two girls, three boys, and one
who felt so bad about it that he got married before t
was out. Jones looked so innocent that I knew he w

and so I followed him all the afternoon, and arrested him when I saw him go into a house on the Bowery. I searched the house, and found Brown's goods concealed where it was not likely anybody could find them; and there was a lot of other goods that I recognized as coming from a store on Broadway, that was robbed six weeks before." And so he goes on, in a way calculated to impress his hearers with the belief that he is a man of genius, and perfectly at home among thieves. He knows all the movements of the gentry that one does not like to be intimate with, and when he finishes his narrative, you contemplate him (to use the language of a certain celebrated orator about another) as the East Indian contemplates his favorite idol: you know that he is ugly, but you feel that he is great. The story of a detective will frequently convey the idea that the movements and actions of professional thieves can be studied, like those of the robin or the beaver; and I have sometimes thought that the burglar and pickpocket should occupy places in natural history along with the birds, beasts, and reptiles that inhabit the earth and make things lively. One officer, who was a witness in several cases, was a favorite with the jury, for the reason that he always gave his testimony in the clearest and most direct manner. I doubt if he used a dozen superfluous words in any instance, and I could almost say that he did not use a dozen of them all together. His statements were short, sharp, and decisive; and it is my impression that he is far more efficient in the service than some of his professional brethren who would occupy fifteen minutes in telling a story that he could give in sixty seconds, and have time to spare.

It is amusing to note the difference in the manner of witnesses. There are some who cannot tell a direct story, no matter how strongly they are urged to do so; and there are others who could not be otherwise than brief. Some of this difference is due to nationality. German and Irish were generally more loquacious than American and English. But it was not all a matter of nationality, as there were instances of extreme discursiveness on the part of the last-mentioned,

while some of the former were brief almost to
And in regard to sex, I must aver that the more t
our witnesses belonged to the gentler half of hum
lady of Baxter Street was one day testifying abou
between herself and a neighbor: a brick and a broo
been used in the fray, and the head of the witness
slightly scarified by the corner of the brick. It wa
affair, — words and blows, and only two or three
that, — but the unhappy victim could not be indu
her story without narrating the whole history of th
Bridget, whose hand had hurled the missile. Freq
foreman stopped her narrative, and told her to cut it
would take breath in the pause, and then, with a p
"I'll tell all about it, yer honor," she would start a
the rapidity of a carrier-pigeon. We soon found it
use to attempt to restrain her, and so we listened as
as possible to the conclusion of her story. There w
of relief around the jury-room when she retired, an
not help thinking that the blow which she averred
"sinseless and spacheless" for two hours was, to a
tent, justifiable.

Another garrulous witness was a German who had
robbery. He persisted in addressing the foreman as "
and the rest of the assemblage as "gentlemens on t
Twice, when interrupted and told to be brief, he com
beginning his statement anew, with more minutene
tail; and at last the foreman found his patience ex
and told the witness, "The jury has no time to listen
stories." "O shudge," said the man, in a tone that
the most deeply wounded honor, "I don't not come
tells you stories; I tells you only the truth." Th
foreman apologized for the unintentional affront, and
mised the matter by inducing the victim to answe
questions, and leave his story to be told in court.
dence was conclusive, and an indictment was pron
dered against the party named in the complaint.

Frequently there were cases that attested the w

ness and depravity of certain members of the human race, and their despicable treatment of relatives and friends. It is an unpleasant spectacle to see wives giving evidence to send their husbands to prison, brothers testifying against their brothers, and sometimes (though none were called before us) fathers testifying against their sons. There was one instance wherein a man testified to a forgery of his signature, committed by a member of his family. He stated that it was a struggle between duty and a respect for the family name for him to come before the jury; "and I only determined to come here," said he, "when I found all attempts to reform this man had failed. I have paid his debts repeatedly, have twice started him in business, and have several times paid checks on which he forged my signature, rather than expose him. I have tried to reason with him, and hoped he would do better; he shows no sign of repentance, and has told others that, out of regard to the family, I shall not dare to prosecute him. I feel that I should do wrong if I allowed him to run longer, and painful as it is, I must do my duty."

Here was a man of sensibility compelled by the conduct of a near relative to appear in court as a prosecutor. It is to be hoped that the culprit will learn a wholesome lesson from his imprisonment; but if his nature is as depraved as represented, the probabilities are, that when he comes out from his term of involuntary labor, he will not be greatly improved.

One day a woman came to testify against her husband for striking her on the head with a piece of iron, which she produced from her pocket. The iron — a stove-hook — had been broken by the force of the blow, and yet the woman was there, with no evidence of having suffered more than a temporary stunning and bleeding. She began her story in a tone of firmness and determination, but gradually melted until her voice was choking and her eyes were tearful. "Do you want to press this complaint against your husband?" the foreman asked. "Yes, sir, I must," she answered, after a pause. "We have been married ten years, and they have been ten years of quarrels. He beats me often; he drives me out at night;

he starves me, and is all the time cruel. He ta
I earn, and spends it, and I cannot live with hi
I have had him before the magistrate several
promises to do better; but when he is let off, h
ever. He will not leave me, nor let me leave
shall have no peace till he is in prison, or one of

One of the most artistic frauds that ever came
edge was developed before the jury. A man ha
money, and taken the mortgage of a tract of lan
on the note. Before loaning it he submitted th
lawyer, who informed him that it was correct
quently the bargain was closed. The note fell d
to protest; the lawyer had, in the mean time, mo
city, and the other parties were not to be found
which was mortgaged lay in New Jersey, and t
the note took the necessary steps to foreclose. A
searcher of titles went to the township mentione
pers, and found that there was no such land in ex

The whole document was purely a myth. The
described could not be found, and had no existen
than if they had been located in the middle of
Ocean. The grantor named in the original dee
dead ten years at the time when the document wa
the whole business was a conspiracy, in which the
betrayed his client. One of the conspirators
state's evidence, and came before us. His posit
particularly comfortable, and he grew restive und
tions showered upon him. Little by little the
drawn from him, and he practically confessed to
the originator of the fraud, ten years ago. The
evidently prepared with care, and had an appeara
ineness enough to deceive any man who was no
of wrong, and had relied upon his lawyer to prote

A case that was at the same time amusing and
was that of a woman, the widow of a laborer, who
cart had been stolen. She was the complainant a
witness against the thief, who was promptly in

stated that she had recovered the cart, but had not been able to find the horse. The morning after the indictment had been ordered, we were surprised to see her waiting outside the grand jury room. A juror asked her what she wanted, and she replied that she came for her horse.

She was sent to the court-room, where, I believe, the thief was speedily tried and convicted. But day after day she came to the grand jury room, and patiently waited outside for the return of her horse. Each morning some one would explain to her that we could do nothing, and she would then go away. But the next morning she would be there as usual, and for nearly a month she continued her patient but hopeless watching. Sometimes she would come twice in the same day, and, when accosted, her answer was always the same, "I want my horse." At first her visits were subjects of merriment, but it was very soon discovered that her mind could not be altogether clear; and our merriment was changed to pity, and our jests to words of sympathy for her loss.

Most of the witnesses were of the unattractive lot, and as their stories were much alike, the business became a little dull after the first week or two. Robberies and fights, and fights and robberies, were narrated until the atmosphere became charged with them. It was the same story, or the same stories with slight variation, and we used to wish for a little variety. And it was astonishing how the advent of a pretty woman used to refresh the wearied jurors, but they were not often allowed that luxury.

One afternoon we came to a case of robbery, and the name of the first witness had a feminine sound as the clerk read it. Jurors had been sitting, not quite at their ease, listening to the testimony of men and women whose stories were as devoid of sentiment as the certificate of a steamboat inspector, and whose forms and faces were as unattractive as a dredging machine. When the witness was called in this case, the jurors listlessly raised their eyebrows, and out of deference to their acquired habit, turned their eyes towards the door. She came; we saw; she conquered. She was pretty; she

was finely attired; her demeanor was full of mode
at the same time, of self-possession. As she walked
to the foreman's place, to be sworn, there was a
straightening of everybody around the room. Chai
drawn nearer to the table, young jurors stroked th
taches, and old ones passed their hands over their bald
to be sure that no cobwebs lay there. Collars an
ties were examined, to ascertain if *en régle*, and when
walked to the witness chair, the double line of heads
straight and attentive as though just from the discipl
Russian drill-master. When the foreman questioned
answered in a voice as silvery as a chime of tea bells
seemed very unfortunate for all her listeners that he
was brief. Not a word that she spoke was lost to any
forty ears that were inclined towards her, and wh
turned upon us a pair of bewitching eyes (I forge
color), there could be no doubt that the unwashed
lettered burglar against whom she complained deser
severest penalty of the law. As she left the room, he
dress rustling like the leaves of autumn in a gentle
we regretted that she could not longer remain; and wh
door closed, an impressible juror sitting near it move
of indictment, which would have been carried withou
sition, had there been no necessity for another witn
complete the chain of evidence. The officer who ca
the thief and recovered the property was then called;
was a commonplace fellow, and we only listened to hi
in the cause of justice. Compared with the lady wh
ceded him, he was as a marine turtle to a gazelle, or as
scow to a yacht, and we were heartily glad when h
through with his testimony. If burglars would be fre
should never be caught robbing a pretty woman who
before a grand jury. That fellow received the heavie
tence allowed by the law, as *she* went before the peti
and told her story under the eye of the judge.

LXIX.

BORROWING AND BORROWERS.

HOW THE BUSINESS IS PROSECUTED IN NEW YORK. — THE NUMBER OF BORROWERS. — THEIR DIVISIONS AND SUBDIVISIONS. — HOW THEY OPERATE. — THE STORIES THEY TELL. — THEIR ENERGY. — ABILITY TO READ CHARACTER. — SUFFERINGS OF THEIR VICTIMS. — FRAUDS UPON HORACE GREELEY. — DEVICES TO AVOID THESE SWINDLERS. — ANNUAL AMOUNT OF THEIR SWINDLES. — HOW A MAN CUTS HIS EYE TEETH.

MONEY is the motive power of the world. In executive capacity, it is an angel or devil. By it civilization must be measured, and all accomplishment wrought. A material blessing, it is the parent, too, of such an amount of spiritual comfort as may not be reckoned. Money will buy everything but health and affection; and, through its aid, the one is protected and the other provoked. No marvel that men worship money; it is the strongest of secular deities, the firmest of supporters, and the staunchest of friends. Nobody can live without it; it is life itself. Every one must and will have it in certain quantity, either by fair means or foul. Every community is composed of borrowers and lenders, and the former are always in stupendous majority. They who have most lend least; and, consequently, borrowers are brought to depend on the class widely removed from prosperity.

The number of men who subsist upon others by persistent fleecing can scarcely be estimated. They abound in this country, especially in New York, which may well be called the haven of the hard-up, and the blissful seat of the professional borrower. All roads lead to New York; all swindlers and adventurers journey thither in expectation of finding victims. Their anticipations are generally realized, and

they bless the stars which have guided them to
Manhattan. They come by every boat and train, fr
state and nation, with devices, plans, and pretexts
teelly defrauding that colossal goose known as the P

Fortunes are so much more easily and quickly m
than in any other city, that the borrower, whatever
ing or his clime, is tempted to visit us because con
his reward. Europeans often wonder at the carele
Americans in respect to money, and are astounded w
that, in this Western land, the chief requirements
curing loans without security are falsehood and ef
They cannot understand how it is possible for hundr
thousands of men to live by politely robbing others,
keep up an assumption of honesty and respectability.
that such things could not be in the old world capit
are surprised at the opposite order of affairs over here

It would be extremely interesting to know the
that this community is swindled out of annually, not
its own citizens and people, but by foreigners of every
I venture to affirm, that there are almost always he
twenty to twenty-five thousand persons whose princip
ness it is to filch from the purse of whomsoever th
Borrowing is their exclusive profession. They have r
it to a science, and arranged it as an art. They hav
tain genius for imposition, a dramatic power of misrepr
tion, a fecundity of invention which would have int
their great advantage in some honest calling. But
esty they will have none; preferring to wheedle, falsi
plunder by the niceties of manipulation and the subtl
deception. These professional borrowers are of div
grees and countless types, though their end is contin
and persistently the same.

The normal mind would suppose that borrowing
hardest way to get money; that earnest and hones
of any kind would be much the easier of the two. B
mind of the professional borrower is abnormal. Hav
clear conception of truth, justice, or advantage, it sees

an extremely obtuse angle. It may have been healthful at first, but it becomes diseased by continued violation of integrity, and finally ceases to have cognizance of its own operations.

Money is often called, and generally seems to be, a vulgar commodity, which generous souls ought to be above considering. The mere possession of money may not be, and indeed it very rarely is, either refining or ennobling; but to be without it, begets unhappiness, opens the door to temptation, provokes a tendency to disesteem, if not to degradation. Nothing is so demoralizing as to be under material obligations that cannot be discharged; and when these obligations are voluntarily and continually assumed, he who assumes them grows to be, ere long, a sycophant and a slave.

"Beware of debts!" is an excellent motto for secular guidance, and its conscientious follower will, in the long run, thank his stars for its adoption. To owe is to be owned, to surrender individuality, to lose independence, to forfeit self-respect. The debtor soon parts with his sensibility, and waxes callous. His course winds downward; at every turn he is forced to do greater violence to his natural self and the cause of truth. Eventually, he becomes a worse offender than those the laws punish; for he is an enemy to society whom society has no power to confine.

The metropolis is infested with so many and such different borrowers, and they are so much a part of the community, that they may be divided and subdivided into classes.

The first class is composed of those who, being in business, draw largely on the future at a venture, but with the expectation of paying in due season. They are usually hopeful, even sanguine, though less prudent and conscientious than they should be, and more considerate of themselves than of others. These men turn their confidence and audacity to profit, provided fortune favors them; but if she be adverse, they go down, and drag their lenders with them. They rise again, however, in new fashions for borrowing, and once more challenge circumstances to do their behest. If they

win at last, they boast of their energy, persev
courage, and despise men who have been more c
and less lucky.

The second class have legitimate callings, bu
credit for capital. They borrow largely without
themselves in regard to liquidation. They are no
though they may be considered negatively, disho
will pay if they can conveniently; but if they c
refuse to fret, resigning their financial burdens to
pelled to bear them. They have the support of a
ishness, and when their creditors complain, they i
to be patient, and wait for the day of judgment.

The third class shift from one occupation to a
in every shifting are liable to deterioration. Ha
they are out of business, but they are always
something new that promises admirably. The
to-morrow, and defer the fulfilment of all their e
to that uncertain fragment of time. They borro
left, careless of whom, never reckoning the amoun
taken or the covenant they have made. They
they are dunned; but if not, they will scatter tl
tions with their breath. After a certain range of
in effecting private loans, they learn that many pe
rather suffer loss than ask for a return of money
take advantage of this sensibility. They fortify
of principle by affirming that a debt is not du
manded, and they always pretend to forget what i
unpleasant to remember. They are poor in p
They invariably want extensions, and regard to-
were non-existent. Catch them with a full purse,
sent your right to a part of its contents, and you
upon payment long deferred.

The fourth class are constitutionally dishono
impersonation of selfishness. They have no in
paying, even at the time of borrowing, and never
long as they can avoid it. They talk a good de
integrity, for the express purpose of imposing

hearers. They consider every man a potential creditor, and try to influence him to that end. They are good for what they pay cash for. Their word ranks with their bond, and both are worthless. They can be depended upon to meet their obligations only when compulsion is employed.

The fifth class are still worse; for they not only regard borrowing as a virtue, but they deem payment a vice. To defraud anybody seems to give them a positive pleasure, and they never felicitate themselves so much as after a successful swindle. They are earnestly opposed to discharging any and every obligation, however sacred the circumstances under which it is contracted. They are among the very few of their kind who would rather throw away money than pay a debt with it; and a creditor whom they have been obliged to satisfy, they reckon ever after as an enemy. By some perversion of understanding and derangement of morals, they have come to believe that the world's goods belong to the most ingenious swindlers, and that they are entitled to such distinction. This class seldom have any position, commercial or otherwise, but prey upon the public without mercy.

The sixth class, so far as known, have never done anything but borrow. They are the most professional of professionals. Their only idea of property is to get whatever they can without an equivalent. Work is hateful to them, and fraud delightful. They struggle hard for the reward of dishonesty, and receive it with a feeling akin to enthusiasm. They have never had the slightest credit; and how they contrive to dupe their fellows, year after year, is one of the mysteries of humanity. Physiognomy and manners proclaim against them; and yet they accomplish such results through dishonesty as upright men would vainly strive for by honorable means. Continual practice renders them perfect in the art of cozening. They are able to espy a loan in a face as a banker is to detect alloy in coin. They appear to have an intuitive knowledge of the contents of an unseen pocket-book, and of its owner's special weakness, which they proceed at once to play upon; they can get money out of a

liable to sink, even below the level o
quire a broad field for operations, becau
cannot be gathered twice by the sam
their crest as they accumulate infam
and more hypocrisy and deeper and b
career continues.

Borrowers roam the island of Manh
midnight, invading every place and pe
They can no more be shut out than
they are all-pervading, persistent, and
climb to the apex of Grace Church, or
in a driving storm, for the sake of a t
could not be hired to do honest work f
They never know dejection; if they
philanthropic enough to make a case f
rob the credulous and cajole the weak
fulness which can only spring from a s
doing evil. While the good suffer an
they enjoy themselves and grow round

Professional borrowers have a knowl
equal to Shakspeare or Cervantes;
they laugh Lavater to scorn. They o
getting accommodation; but this does
at fault, — only their love for exper
they make upon the unwilling are t

has gone before them, and he can discover at a glance that not a single dollar can be torn from their financial souls. Such an absolute incapacity for procuring money gleams from every lineament of the rich, that the rudest savage would recognize it on instinct.

If borrowers preyed upon the prosperous, they would do little harm; but, unfortunately, they find their victims among those who have not locked up their hearts and thrown away the key. The man who lends is primarily a good fellow; and that he should be driven into scepticism and cynicism by deliberate swindles, is deplorable indeed. Such shattering of faith is a sin against the race; and if a professional borrower did not aspire to total depravity, he would hesitate before committing it. But he stops at nothing, except it be the vision of a debt discharged, or the ghost of an unredeemed due-bill.

Hundreds of our citizens, strange as it may appear, are in perpetual dread of borrowers. They are aware that their countenances and their hearts are against them, and that, resolve as they will, they are in danger of being wheedled. They are angry with themselves whenever they succumb to the blandishments they have suffered so much by: and still, when assailed by a direct petition for a loan, they yield without protest.

Plausible swindlers seem to keep in memory every over-amiable man who will open his purse for the telling of a piteous tale or specious story. They are ever on the trail of such a member of the tender-hearted tribe, and they inevitably run him down. Go where he may, they invariably find him out, and, with wheedling tongue, lick up his substance.

The kind and gentle Horace Greeley was, until the last day of his life, the victim of impecunious cheats. He was opposed, on principle, to giving them a penny: and yet, in practice, he was a perpetual purveyor to their imaginary needs. For many years, I doubt if any energetic applicant for a loan ever left the presence of the great journalist without carrying his point. During the last twenty-five years of

his life, Mr. Greeley must have lent to entirely irre
persons, without the slightest expectation of get
thing back, not far from fifty thousand dollars. Ev
he would berate himself for his encouragement of su
founded loafers," as he styled them, and express
mination to reform his loose and lavish habit. But
new week would be resumed the open-handed ge
from the impossibility of saying "no" even to the m
parent impostor.

While entering the Tribune office, the editor wou
notice a borrower lying in wait, and tell him be
there was no use of asking for money; that he could
another penny under any circumstances. The cozen
ever, knowing his man, would follow him into the
and in less than a minute Mr. Greeley would be seen
his pocket-book, and be heard to say, "Now, take t
don't come here any more; for I'm going to turn ov
leaf."

Of course the new leaf was never turned over, un
backward direction. The journalist's reputation as a
of suckers was so firmly established that he drew th
every quarter, and could not shake them off.

Hundreds of other New Yorkers have acquired m
same kind of fame, and are exposed to the same sieg
similar results. Fearing borrowers as Captain Cuttl
his landlady, they seek their places of business furtiv
go home by back streets. Not infrequently they loc
selves in private rooms and hide in out-of-the-way
to escape itinerant chevaliers of industry. While hc
gentlemen are thus skulking to avoid borrowers, un
lous debtors walk composedly through the crowd, an
their creditors out of countenance — thus showing t
ward advantage that dishonesty possesses over upri
and fair dealing.

Some persons have been victimized so often, tha
have hung up placards like these in their offices: —

"No money lent here in sums less than ten thousand dollars."

"All applicants for loans are expected to furnish mortgages on real estate in the city."

"Gentlemen desirous of borrowing are referred to the Rothschilds, in London, Paris, and Frankfort."

"First-class collaterals required on all loans."

"Rates of lending to-day, five per cent. a minute, and nothing received as security except double eagles."

"Persons who are hard up are politely, but firmly, requested to go to the devil."

The effect of these announcements is reputed to be excellent. In numerous instances they prevent professionals from revealing their chronic wants; in others, they abash fellows who had made up their minds to arrange for a loan; and in others again, they cripple the hopes formed of a successful swindle.

I have been told, by a person who tried the experiment, that these manifestoes have saved them thousands of dollars a year, and an infinite amount of annoyance besides. Such placards certainly have a fine extinguishing effect upon the flaming ardor of the social highwaymen so superabundant in Gotham.

The length of time that a borrower (outside of business) has been plying his vocation may be determined by the amount he asks for. When he is rather new to the trade, he wishes usually to be accommodated with a loan of five hundred dollars, and, if that sum be inconvenient, he thinks he can get along with something less. He has been known to accept thirty or forty cents on the dollar of his original proposition, and generally it is not safe to offer him any sort of compromise.

After a year or two of genteel swindling, the borrower fixes his demand at from one hundred to fifty dollars, but can

be induced to take twenty-five dollars as a sort
on the obligation, which he fancies the comm
some mysterious manner, incurred.

Ten-dollar swindlers have, for the most pa
dishonorable service, and are among the most
their nefarious guild. They are to be found e
in the street, at the hotels, at the theatres, at th
at private parties sometimes, — where they mak
typed excuse that they have left their porte-monn
coat, and that they would be profoundly obliged
loan until the day following.

The petty impostors, who solicit loans from fi
fifty cents, have usually met with so many rebu
make their approaches with a diffidence that us
them. They mention five dollars with an infirm
evincing that they have no expectation of obta
drop down to three, two, or one with a precipit
ing their familiarity with disappointment. As a
they inquire dolefully for postal currency represe
dollar; and it is seldom they fail to get it, th
commiseration, from the person besought.

One of the most transparent and impudent ord
dlers are those who tell you they are in a certain
could be easily helped if they would apply to t
brother, or some other near relative. But they ar
they take pains to inform you, to demean themse
fashion, and therefore they have recourse to a
whom they have not the slightest claim. This m
rowing, an insult to the lowest intelligence, deserv
swered with the boot; and yet, as it involves a
of flattery, it frequently meets with a practical re

It is estimated that, independent of all regular
tile transactions, the denizens of New York lose
six million dollars annually by swindlers claimin
lanthropists, reformers, scholars, business men, an
in temporary distress. These miscellaneous bor
pretexts of every kind, all of them appealing to t
of our common nature, if they were only true.

The sole difference between professional borrowers and beggars is, that the former always promise to pay, and the latter never promise, though one can be as much depended upon for settlement as the other.

Such recurring calamities as visit these unblushing negotiators of loans might have been gathered from the multitudinous woes of the Greek tragedies or the grand operas. The borrowers are very seldom unprovided with a dead mother, or an unburied wife, or starving children, or a dishonest partner, or a stolen pocket-book, or a deferred remittance, or an absolutely necessary journey, or a remarkable mishap of some sort. They infest the principal hotels at the busy hours of the day, and employ their best energies in introducing themselves to the pockets of the boarders. Nearly every public house appears to have its special haunters, and one ingenious story will serve their purpose for a month or more. Borrowing has long been systematized here, and every season is marked by new inventions and pathetic fictions to delude the generous and unwary.

The audacity of the professional borrower is grand and exalted. He will stop your carriage in the park, and invite you to a pecuniary desperation; will make known his financial embarrassment as you are walking out of church with the present or future Mrs. —— on your arm; seek a private interview, with a monetary purpose, before you are up in the morning.

If you were to be hanged, — of which there is no danger in New York, whatever crime you may commit, — he would steal up behind the sheriff, as the latter was drawing the black cap over your eyes, and ask you if you could not spare ten dollars, now that you were going to a country where national bank-notes are not current.

Most New Yorkers understand so thoroughly the trick of courteous cozening, that, whenever any man they do not know intimately seems anxious to see them, they are convinced that he is in quest of a loan, and in nineteen cases out of twenty their convictions are just. Neither friendship, nor

love, nor detectives can trace a fellow to his lair, or
his sanctuary, like a borrower. He will pursue
round the world, and shame a sleuth-hound from the

"Lost in the great city" is often a sad truth; but
be converted into a fiction if a man in need of mon
his attention called to the pocket-book of the per
posed to be lost. You cannot so bury yourself in th
lon of a new world that the borrower will not bring
light. And, if you have had experience, when a
flatters you, you will understand, from the degree of
pliment, the exact amount of the loan he expects to

LXX.

AMONG THE DETECTIVES.

DETECTIVE LIFE. — CURIOSITIES OF LIFE IN A GREAT CITY. — NOT KNOWING YOUR NEIGHBORS. — PECULIAR ACQUAINTANCES. — ROBBERY OF A DRY GOODS STORE. — INGENIOUS DETECTION OF THE CRIME. — LOVE AND JUSTICE. — A SURPRISING DENOUEMENT.

THERE are some men who seem better fitted to live beneath the surface of the earth than in the open air. Their habits are much like those of the mole or the weasel, and sometimes they are not altogether unlike those animals in general appearance. They have the burrowing propensity of the rat and the woodchuck, and in many instances their lives are about as reputable as that of the first-mentioned animal. They seem to avoid the light of day, and to spend their lives in undermining the works and lives of others. Great cities can furnish a good supply of these men, and the rural districts are not altogether destitute of them. They flourish best in large cities, as there they have a better field for their operations than in the country. In the country everybody knows everybody else for a considerable distance around, and can tell you about his family and its antecedents for as many years as you care to know. Frequently the people observe the manners and habits of their neighbors with more care than they observe their own.

In the city men go about their daily occupations, knowing little and caring little about others, except those with whom they come in contact or have relations of a business character. In New York, for example, there is not one householder in five who knows the name and occupation of his next-door neighbor, and generally he does not care to know. People may occupy the same house for years without knowing anything

about each other. I can gi
own which will illustrate wh

During the first year of r
remaining a few weeks at a
of lodgings in a private h
exterior pleased me, and o
attractive announcement, "
made known my object, saw
and engaged it. Next day I
hotel, and for a year and a h

I did not know the name
the proprietor, and never tro
of the rooms on the floor
in ascending the stairs, I me
an acquaintance whose busi
I was located, and whose de
hailed each other, and our co
he had been for two years a
had been there nearly a yea
or almost anywhere else in
should have known each othe
less than a fortnight.

City life, politics, and p
opportunities they afford for
liar people. These acquain
rapidly; but as one moves al
sooner or later, without any
introduced to men whom he
recognize in public. Withou
make the acquaintance of c
playing card or entering a
quainted with gamblers. W
of the kinchin lay, or familiar
of the inhabitants of Blackw
tiary, he may become acqu
grades. Without doing any
"shadowed" he may be fami

speculating in stocks he may know the men whose fortunes are made and lost on Wall Street. A great city is an epitome of the globe, and in its streets, and alleys, and by-ways may be found all the vicious and dangerous elements of human existence.

Some years ago it was my fortune to become acquainted with a professional detective. He was not of the elegant sort, whose labors are confined only to the exposure and punishment of crimes of the higher grades, but he was a man who, to use his own language to me one day, was 'ready for anything.' He told me several stories of his experience. He did not present documentary evidence of their authenticity, and some of them were rather too much for my belief. Others were plausible enough to be true, and as the man always appeared to have plenty of money, I concluded that he must be an expert at the business. One evening he told me his experience in working up a case of robbery, which I will endeavor to give as nearly as possible in his own words: —

"A dry goods merchant on Broadway had lost a considerable amount of property at various times, but on no one occasion was there a large quantity taken. Of course the clerks in the establishment were suspected, but there was no way of discovering whether they were guilty or not. A close watch had been set on all of them, but nothing could be discovered. I was engaged to work up the case, and to enable me to do so, I was employed in the store as an extra clerk and salesman. It was thought that the foreman and floor walkers might be guilty of the robbery, and therefore they were not taken into the secret. The head of the house explained, however, to the foreman that I was a relative of his wife, and had been thrown upon him to provide for. It was therefore understood that I was not to be required to work very hard, and was to be allowed to go out whenever I asked permission. With this understanding I went to work at my new business. I did not know anything about dry goods, nor about selling them, and consequently they put me upon the

commonest articles, which were not in very great de
This gave me plenty of time for looking around and o
ing the habits of the clerks.

"I became acquainted with one after another, but ma
headway for several weeks in discovering the secr
accompanied the clerks to their rooms occasionally, and
times we were at the theatre together. I knew the sa
that were paid in the establishment, and I knew just
much money each man could afford to spend, and my c
was to find out what man among them was living beyon
income. All of them appeared to be quiet, well-bel
young men. Some of them were members of the Young M
Christian Association, and others patronized the Merc
Library, and spent most of their evenings there. Thr
four were a little inclined to fast lives, but evidently did
have money enough to carry out their wishes.

"After a time I found out that one, who was the most q
and unobtrusive of the whole lot, seemed to be living a
beyond his means. Upon him I fixed my suspicion
watched him closely both in the store and out of it.

"He and I became fast friends. We went about the
together; we visited the theatres and beer-gardens, an
Sundays took a trip to Coney Island, where we occasion
spent several dollars in entertaining ourselves and ch
acquaintances; but the young man, whom I will call John
was constantly on his guard, and whenever I proposed
new amusement or any additional expense, he always oppo
it, and said that he could not afford it, though somehow
generally did afford it before we got through.

"I found he had a sister living in Harlem. Occasion
but not often, she called at the store. She rarely bou
anything, and never remained longer than a few minutes.
visited her every few days, though sometimes a week or t
might intervene between his journeys to the place where
lived. Several times, when he was absent and I knew he w
to be away for the evening, I visited his room, and searched
carefully; but never a thing could I find to implicate him

the robbery. Not a scrap of silk or lace or anything of the sort could ever be discovered in the room.

"I next managed to be introduced to his sister, and of course I pretended a great liking for her. She was living in a very quiet way, in a boarding-house, and was a teacher, on a small salary, in one of the public schools. Having ascertained her salary, and, calculating her expenses, making an estimate of the value of her clothing as nearly as I could, I was satisfied that she was living somewhat beyond her salary.

"One day Johnson told me that he was going with his sister to a school picnic. He had obtained leave of absence from the store, and I thought it an excellent time to make investigations. So I went to his sister's boarding-house, inquired for the young lady, and of course was told that she was away. I explained to the landlady that I had received a message, saying that she would be at home several hours earlier than she had expected, and that I was to meet her that afternoon, to go on another excursion. I said it was about time for her to reach home, and, if the landlady had no objection, I would wait in the parlor. As I had been there frequently, and the landlady knew me, she made no objection. Luckily she went out a few minutes after, and gave me more freedom to operate than I had expected.

"I immediately went to the young lady's room, — of course it was very impolite for me to do so, — and searched it thoroughly. It is of no use telling you all I found there, unless you have never been in a lady's room, and do not know what it contains. She had a very good wardrobe, better than most young women in her position. It struck me as very odd that she had four dresses of rich black silk, which did not appear to have been made a very great while. Four dresses of black silk are a pretty good supply for a school teacher on a small salary, and I made up my mind that the silk came from the dry goods store where Johnson was engaged.

"There is a great difference between believing a thing and proving it. You may be certain of it from the circumstances, but it may not be very easy for you to go into court and show

its reality. Now, here was my predicament. I dresses were too many for one young lady, ju thought, when I searched a man's trunk, and fo coats of different sizes, and no trousers or vests, remarkable wardrobe for a gentleman to have. I to get at the fact, and show the connection wearing apparel of Miss Johnson and the Br goods store?

"To help matters along, I made love to Miss Jo regular way, referred to my relations with the house, and obtained an indorsement from the head as a relative of his wife. I was getting along ver I did not want to propose and get an engagem that might make the situation a little awkward. I day of proposal on the ground that my uncle in t from whom I had expectations, was opposed to m except to a lady of his choosing; and that I should to wait until he had handed in his checks, w be before a great while, as he had a lovely cou rheumatism, supplemented with the dyspepsia an that the situation was perfectly charming.

"Johnson approved of my attentions to his sist course we became warmer friends than ever. All was studying to entrap the two, so as to fasten the the dry goods house upon them. One day I preten admiration for a certain kind of silk that I had s store. I told Laura that it suited her complexio and was just the dress she ought to wear. It w colored silk, of a peculiar shade, which had beer pressly to order for the dry goods house, and I knew had the monopoly of it. I spoke about it several said I hoped, one of these days, to be able to prese a dress of this sort, but did not know when it would income, just at that time, was too small for any lavis

"Love for me made the girl incautious. Four o later, twenty or thirty yards of this silk were mi the store; and in a week or more, when I made a

surprised me with a dress of the material I had so much admired. I praised it, and I praised her, and she was happy.

"I invited her to accompany me the following evening to a theatre, and told her she must wear that dress; that I wanted her to be the prettiest and best dressed woman there; and, dressed in that, I knew she would be. We went to the theatre, and afterwards to Delmonico's, where I had arranged to be shown to a private room for supper. I had invited her brother to join us, and, to avoid his suspecting anything, I told him that the day before, I had received a remittance of fifty dollars from my uncle, and was going to have a pleasant evening, without regard to the expense.

"But her brother was not the only person to be there that evening. The head of the firm was waiting where he could see us enter, and with him was a policeman.

"Our supper was brought, and was progressing finely; we had each taken a glass of champagne, and possibly two glasses, and, as the servant came into the room bringing something I had ordered, he was followed by the head of the firm and the man in blue. Johnson was arrested for theft, and his sister for being an accessory to the theft. Both turned pale; the young lady fainted, so that we had to dash water in her face — seriously injuring the elegant dress she wore. Johnson stoutly denied his guilt. He was taken from the room before his sister recovered. When she came to her senses, we told a pardonable falsehood, and said that he had confessed everything. She supposed our statement true, and then acknowledged that she had first urged her brother to the commission of the theft, in order to gratify her love for finery. With an eye to economy, she had always induced him, when stealing on her account, to take enough to pay for making up the material, so that she would not be subject to any expense at the dress-maker's.

"Johnson maintained his innocence until his sister told him that she had made a confession. Then he acknowledged his guilt, and explained how the robberies had been carried on.

"He had managed to ingratiate himself with the porter who

LXXI.

WAR AND PRISON ADVENTURES.

EXPERIENCES OF AN ARMY CORRESPONDENT. — RUNNING THE BATTERIES OF VICKSBURG. — EXCITING SCENES. — PERILOUS SITUATION AND HAIR-BREADTH ESCAPE. — SHOT, SHELL, STEAM, FIRE, AND WATER. — TWO YEARS AS A CAPTIVE. — TUNNELLING. — ITS MODE, MANAGEMENT, AND MISHAPS. — TOILING FOR FREEDOM UNDER GROUND. — BOLD AND PROSPEROUS EFFORTS FOR LIBERTY. — LIFE IN A DUNGEON. — PERISHING BY INCHES. — DEATH ON EVERY HAND. — SUBTERRANEAN SEEKING FOR THE LIGHT. — SELF-DELIVERANCE AT LAST.

WHEN I was a small boy, and fed my miniature mind with thrilling accounts of the adventures of famous men, of their incarceration in prison, and of their escapes, I had no expectation of one day sharing in experiences of a very similar character. I can understand now why I felt so much interest in the biographies of Baron Trenck, Walter Raleigh, Cervantes, Silvio Pellico, and other noted personages who had spent much of their life in confinement. I little dreamed then that I should be for two years a prisoner, and last of all a prisoner in my own country, held by my own countrymen.

As may be supposed, the fortunes of war — our Great Rebellion — proved adverse to me, and I became the occupant of no less than eight different southern prisons.

The way I chanced to fall into the enemy's hands was this. Having been a war correspondent for twice a twelvemonth, and having learned, under a variety of circumstances, how it feels to be shot at, and what the feeling is of just escaping death, I had a curiosity to enjoy the sensation of running the formidable batteries of Vicksburg during the spring of 1863. I communicated my intention to two of my companions, and they said that they would go with me. We were at Young's Point, Louisiana, whence the army had already begun to move,

by land to New Carthage, designing to cross th
sippi River there, and attack Vicksburg in the rear.
ber of gunboats and several transports had already
batteries, and on none of these had I been able t
permission to go. Just at this time, another expedi
sisting of two large barges loaded with provisions, a
to a steam-tug, was fitting out, and almost ready
Running the batteries was considered extremely pe
so much so that the soldiers accompanying the tra
instead of being ordered to that duty, were allowed
their own inclination. The custom was for the officer
regiments to announce that so many privates were
and that those who wished to take the risk wou
forward.

The special expedition in which we military journalis
concerned was deemed an unusually dangerous one,
reason that the river had then fallen, and there was c
able probability that the boats might get aground in f
the great guns, and be shot to pieces. Moreover, th
was at the full, and at the hour of our starting — a litt
midnight — would be in the very zenith of the h
The other vessels had gone down on dark and stormy
when they could hardly be seen from the Mississipp
and when the probability of their being struck wa
small. Several old south-western pilots advised me
try the experiment; for, if I did, the chances were tw
one against my coming out alive. "I know the rive
said, "and the state it is in just now. Besides, those
barges will be so clumsy, hitched to that little tug, that
be dead sure to stick on that bar opposite Vicksbu
then you boys'il have a lively time. The rebs will
you from stem to stern, and there won't be a Yankee
tell the tale."

I laughed at this gloomy picture, quoting, "The go
care of Cato." The pilots, who had never read Cato,
heard of Addison, replied in their literal way that they
know my name was Cato, and that they were sure the
no such steamboat on the river.

The night we cast off our lines and floated down the Mississippi on our eventful expedition was as lovely a night as I have ever seen in any part of the world. The sky was without a cloud; the air was deliciously soft, and the heavens were so bright that we could read the newspapers without the slightest difficulty. There were thirty-five of us in all, including some twenty enlisted men, who had volunteered to go along in order to resist the enemy, if our vessels should be disabled and boarded. Never was any expedition worse prepared. The two barges were laden with barrels of pork and boxes of army bread, and on the top were bales of hay. The hay, which was extremely dry, was scattered all over, so that a spark — not to speak of a bursting shell — might ignite it in a moment, and so destroy our vessels inevitably. In addition to this, we had not a bucket on board, in the likely event of fire; nor had we a single small boat to get away with, should the flames master us. Still, all being volunteers, none of us were obliged to go unless we wished, and, as we said, the greater the danger, the greater the sensation, and the more we should enjoy its memory, provided we were fortunate enough to escape. It is due to the prudence of Captain ———, who fitted out the expedition in such an admirably reckless manner, to say that he did not intend to accompany us.

We had about five miles to run before reaching the batteries. There is a sharp bend in the river just above Vicksburg, caused by a tongue of land or peninsula on the Louisiana side. This peninsula had been covered with trees; but the rebels had cut them down, so that their guns had full sweep across it, and could command any and all vessels descending the stream when they were nearly three miles above the batteries. We floated at first, knowing that the puff of steam from the tug could be heard at a long distance in the midnight silence, and would necessarily attract the attention of the enemy. The first twenty minutes were passed quite pleasantly. We opened a bottle of wine, and drank to the success of our adventure, lighted our cigars,

and chatted upon the possibilities of the situatic
disaster might befall us, we tore up the few p
we had in our pockets, and indulged in all
respecting the potentiality of the result.

We had scarcely reached the bend of the Mis
we saw a flash from the hostile guns, heard the
that the outer barge was struck. We thought
by the first shot was pretty good to begin wit
too, that we should be nearly three quarters of a
fire, — most of the time immediately in front of t
— our prospects of a happy issue to our expediti
from brilliant. There being no further use in at
steal on the foe, the engineer of the tug set th
motion. Our progress, hampered by the huge
necessarily slow — very little greater than that of

The initial gun was followed by a hundred
several miles along the Mississippi shore, the batte
forth shot and shell, until the bank of the river
ablaze. Those who went for excitement certai
The roar of the guns — some of the largest calib
most deafening. The round shot howled over ou
shells shrieked fiercely and then exploded, many
above the barges. We could hear fragments falli
and it appeared as if the shot, so thick did they
times grazed our hair and our whiskers. As a pyr
hibition, it was splendid, and we should have enjoye
had we not heard in the brief intervals of the
the groans of the poor fellows who had been stru

Such a situation is certainly a strong test of cou
frequently quails in an entire state of placidity, wl
not blanch before the deadliest peril, could it be a
All we had to do — all, indeed, we could do — v
and take it. There was no possibility of shrinkin
ing, even had we been so inclined. We were pre
position of a regiment under a galling fire, and or
move or return a single shot. Boom, bang, b
yship, hursh! roar, crack, shriek!

Such were the indescribable sounds that greeted and surrounded us for fully forty minutes, and you may be sure the minutes were not short.

The whole night was radiant with flashing artillery and bursting shells. The brightness of the moon and stars was quite eclipsed; they looked dim and yellow through the blaze and smoke of war. The barges were struck again and again, and so were the bales of hay; but still the boats were not materially injured, and we could plainly hear the puff, puff, puff, of the tug, doing its best to carry along the great burden to which it was tied.

My two journalistic friends and myself were side by side, watching the exhibition with an interest that might be called personal. We were not excited, as we had supposed we should be, owing, no doubt, to the fact that we had had two years' experience in the field. And yet we were forced to admit that it was about the liveliest experience under fire which we had ever enjoyed. I presume that our nerves were at a higher tension than we suspected, though we talked very glibly, and discussed the probability of our getting through, albeit much of what we said was lost in the infernal din.

What the French call the fire of hell was unremittingly kept up. A hundred guns seemed to explode, and a hundred shells to burst, every second. We suggested that the so-called Confederacy would soon expend all its ammunition, if it long continued such a tremendous cannonading; but then we remembered that long before it could be exhausted, we should be in a condition to know or care very little about it.

Under such circumstances, men who have any coolness, or inclination to speculate, are very apt to become fatalists, irrational as fatalism is.

"I don't believe," said one of my companions, "that I am destined to die here." And the other remarked, "If my time has come, it might as well be here as anywhere else."

Our speculations were cut short by an explosion, not so

loud as, and altogether different from, any other taken place; and almost at the same instant there w of steam, with a great deluge of live coals and c about us. "What the devil is the matter now?" correspondent. "This seems to be a new sensati claimed the second; while I solved the mystery by that the boiler of the tug had exploded.

That I was right, was proved by the immediate of the regular puff, puff, puff. A large shell had fa the little steamer, and, bursting, a fragment had p the boiler, causing the explosion, and throwing the the furnace upon the dry hay covering the upper pa barges. The loose hay caught at once. We ran to ex it; but our effort was vain. The fire blazed up be behind us, and not having any means of putting it abandoned further endeavor. On looking around, covered that a number of the soldiers, and those of t of the tug who had not been killed outright, w severely scalded. Others, as we knew, had bee wounded by shot and shell. At least half of the th men with whom we had set out were either dead o hurt, and our first thought was to help the poor fellc could not help themselves.

Those who were sound began pushing the bales of the river, and putting the wounded upon them. The burned like tinder, and in a few minutes after they h ignited, two thirds of them were wrapped in flame rebels, strangely unmindful of their much boasted c continued their fire, though they must have seen t expedition was utterly wrecked. Having gotten wounded, we who were unharmed jumped overboa secured a bale apiece, designing to float down the r yond the city, and then those of us who were experi mers, at least, strike out for the Louisiana shore, and get back to our camp at Young's Point.

Alas for the vanity of human expectation! One journalistic associates and myself had arranged this prog

to our satisfaction, when, hearing the sound of rowlocks, we knew the enemy must be out in small boats to capture the survivors of our ill-fated expedition. Consequently we left our bales, and floated, — nothing but our faces out of the water, — believing that by so doing, we should remain unnoticed. We had not floated quite a minute before a yawl, filled with armed men, was rowed up to us, and we were seized and drawn into the boat, with the remark from a rebel captain, "We will get you d——d Yankees once in a while."

We did not like our capture, but we took it good-naturedly, though it seemed rather hard that, after escaping shot, shell, steam, fire, and water, we should have the bad luck to fall into the enemy's hands.

The old pilot had proved a prophet. There was not a single Yankee left to tell the tale. The expedition was reported a total loss, with all on board, and some of us had the pleasure, long after, of reading our own obituaries in the northern journals. They were very kind; so kind, indeed, that we had some hesitation in declaring ourselves alive, lest, when we should really shuffle off this mortal coil, we might not be spoken of so generously. General Sherman, who then had, and may still have, a tender affection for war journalists, expressed his sympathy that night with our reported death by saying, "We shall have despatches from h—l now before breakfast."

Even we correspondents, who had had glowing visions of the highly rhetorical accounts that we had intended to furnish to the New York journals, were deprived of the privilege of putting a word on paper. Our career of imprisonment began, and a very dreary career it was. We were thrust into two places of incarceration in Vicksburg; were then transferred to Jackson; then to Selma; then to Atlanta; then to Richmond, and finally to Salisbury; having in that time been the inmates, as I have said, of eight different prisons, each one of which was, if possible, more repulsive than that immediately preceding.

At the famous Libby Prison we made our earliest efforts to

escape; for at the other places we had not re
enough to perfect any plans for freedom. We
faith in tunnelling than in anything else; but h
the upper floors of the old tobacco house in Rich
no opportunity to put our faith into the form of
could only have tunnelled the air, we should have
the camp of the army of the Potomac before we
month in the Libby.

Numerous efforts were made by the Union
we were with them, to have their quarters ch
ground floor, on the score of comfort; but th
keepers were too shrewd to put them there, know
that the prospect of escape by tunnelling would
creased. The northern invaders, as they were
could get down to one of the lower floors, a fe
but these were not enough to do the digging, a
hard work required, within any safe period. T
however, surrender their plans, and frequently
used to discuss at length the most available mea
ing our freedom.

Months after, when one of my fellow-scribes
(the second had been duly exchanged at Richmon
sent farther south as "hostages for the good co
Washington government," we were delighted t
the gallant officers we had left behind in Libby
succeeded in digging the long-contemplated tunn
was better, getting their liberty once more.

The ground floor in the most western of the thr
warehouses composing the Libby Prison was dev
the winter of 1863–4, to storage and lumber, and
visited by the rebel officials. This was very fortu
Yankees, who had been prevented before from
operations in that quarter, in consequence of the
of the floor by some of the southern subordinate
as the prisoners learned that they could operate t
they sawed a hole through the floor of the secon
fully concealing it by the piece of plank they ha

This story was part of their quarters, and they could readily determine when the coast was clear, and let down some of their number, who were not long in removing enough of the first floor to begin their digging. They worked like beavers, relieving each other every two hours, and performing all their labor at night. They began their tunnel just inside of the outer wall, went below the foundation of the building, and then dug laterally to a point where they deemed it safe to come up.

I have had so much experience in tunnels that I regard myself as an authority thereon. They are generally only large enough to admit the body of a good-sized man, who creeps into them, and, lying nearly flat, digs as hard as he can with any instrument he may procure. After the tunnel has been extended thirty or forty feet, lack of ventilation prevents the burning of lights, and anything like freedom of breathing. The Libby tunnel was some seventy feet long; and to remedy this defect, the officers made a large pair of bellows, much resembling those used by blacksmiths, with tacks, blankets, and boards. With this rude but ingenious instrument, they supplied with oxygen the two men employed in the tunnel, one in advance digging, and the other behind, carrying out, or rather hacking out, with the dirt in a haversack. Progress, under such adverse circumstances, is necessarily slow, the digging generally being done with a pocket or case knife. Sometimes not more than two feet is made by twelve hours of hard labor, and no one works more than an hour at a time, as the foul air is very exhausting.

The Libby tunnel was not completed in less than a month, the officers being in constant dread lest it should be discovered. But it was not even suspected, and on a certain morning everything was pronounced ready for the test of its practical availability. Those who had done the most work and been the longest in confinement had precedence. About ten o'clock the prisoners began crawling into the tunnel one by one, while the entire number, including those who had no expectations of freedom, lay anxiously awake, awaiting the

OUR QUARTERS IN LIBBY PRISON.

Libby; and yet we had, if not expectations of escape, a settled determination to employ every possible means in our power. We plotted and plotted by night and by day; had secret communications with Unionists in Richmond; had rendezvous appointed in the event of our getting out; had the guards bribed; had our programme fully arranged; indeed, had everything complete except our escape. The fault certainly was not ours; for prisoners were never more prudent, never more watchful, never worked harder than we. Fate seemed to be against us. There was always a hitch, a tangle, a broken link, for which we were not in any way responsible. Having three of the guards properly bribed, one of them on the particular night when we intended to get out would inevitably become intoxicated; some agent whom we had trusted for a certain emergency would fall ill; a highly important message would miscarry at the critical moment; and thus were we cheated of our exertion and enterprise so repeatedly that it is singular we did not despair altogether.

We were betrayed once by a contemptible Marylander, who, himself a prisoner, and pretending to be excessively loyal, imparted to the authorities what he had suspected, in the hope of gaining their favor. The result was, that we were thrust into a noisome dungeon, and kept there for two weeks, with half a dozen deserters from the rebel army, who had varied their military life by forgery, burglary, and assassination. Having been returned to our old quarters, and having just formed a new project for emancipation, which we felt assured would fulfil its purpose, we were ordered off to Salisbury.

I remember that three or four desperate rebels in the condemned cell adjoining the apartment in which we were confined, freed themselves in an audacious manner, that entitled them to my admiration. They sawed through the floor, keeping up such a rattling of their chains while at work, that nobody could hear them, got down to the first floor, seized each a loaded musket from one of the racks, dashed out of the front entrance, shot one of the sentinels through the head,

knocked another down with the butt of a gun, r
third, and disappeared in the darkness. The thir
fired his piece after them, and a general alarm w
but, in spite of the fact that the Castle was in a
quented part of the city, the bold fugitives got cle
and were never seen after in Richmond. They d
prosperous issue for their reckless courage; but
something of luck in it, and I doubt, had I made
attempt, if I should have been able to reach the out

At Salisbury we were kept like cattle (except that
not nearly so well treated), in a large enclosure, sle
rather lying down, in an old building formerly used a
factory. This building, with a number of miserable ou
was employed as the prison quarters, until some thou
enlisted Union men were sent down there, when a s
freezing, starving, and murder seemed to be delibe
tablished by the rebel commandant.

Things soon became so bad that they could h
worse. It was death to remain, and even if an at
escape proved to be death also, we thought we sho
the satisfaction of dying in an effort to obtain freedo
of perishing like rats in a hole.

Salisbury was the most hideous prison-pen, not
cepting Andersonville, in the entire South. Its one
ing feature was, that it was not without facilities fo
ling. These did not amount to a great deal, for th
that we had spies in camp; the captives being ma
deserters from both armies, professional ruffians,
creants of every sort. Moreover, so intense was th
ing that not a few men, naturally loyal, but not
stuff, could not resist the temptation to treachery, w
knew that their treachery would be rewarded by
and raiment for the want of which they were perishi

Tunnels were digging constantly, and were as c
failing for the reasons I have mentioned. As my fi
myself were the only war correspondents at Salis
were individualized to our fellow-captives, and hav

longer in prison than anybody else, they were not only willing, but glad, to do anything which would aid us to escape. Consequently, we were informed of any and all plans, and given an interest in every tunnel that was projected, begun, or partially constructed. After one had fairly gotten under way, we would be invited to, and we would, examine it. Creeping on our hands and knees through its length, and then retreating in the fashion of a crab, we would pronounce the tunnel good, with the simultaneous instinct that it could not long remain undiscovered after we had made its acquaintance.

No wonder we often thought we were destined to breathe our last in durance vile. Every scheme, contrivance, or device for our deliverance appeared doomed to an untimely nipping. I can recall a dozen occasions when I entered tunnels in the evening just ready to be tapped, and through which I intended the next night to take my departure. The first thing I would learn, the following morning, would be, that somebody had turned informer, and that we must have recourse to still another enterprise.

I never did much work myself. I was as willing as Barkis; but I had little skill in that species of practical engineering, and was so much excelled by my companions in captivity that I did not insist on performing my share of the labor. So many of our tunnels had exploded, as we used to style it, that the authorities put on double lines of sentinels, compelling us to carry a tunnel so far that the obtainment of oxygen became impossible. Sixty or seventy feet, or even eighty or ninety, may be managed; but one hundred and forty or fifty feet cannot be accomplished without a ventilating apparatus, and at Salisbury we were absolutely without implements of any kind. It was quite common there for our custodians to draw us up in a line, and compel us to surrender, not only our valuables, on pretence that we might bribe the guards, but also our pocket-knives, and anything that might in any way aid us in our liberation. Old scraps of iron, and whatever might be converted into a sharp instrument, were, therefore, in active demand, and the supply entirely inadequate. I

recollect that I was hailed with joy, on a certain afte when I exhibited an ancient case-knife that I had con to conceal, and which not the neediest rag-picker in could be persuaded to throw into his basket.

How the poor unfortunates at Salisbury did toil at tu and how perverse fortune always proved! I make no tion that scores of the captives, at the rate of three dol day, would have earned hundreds of dollars each in dig and all, alas! to no purpose. The fabled industry o Trojans was not to be compared to theirs. No sooner one tunnel discovered than they set about making an and when that blew up, they turned to a third, and a fo and a fifth, and a sixth, as if they were incapable o couragement. Hope springs eternal in the human br especially when the human breast is famishing by slo grees, and freedom smiles never so faintly in the fa distance.

If there be any severer labor than tunnelling, I am acquainted with it. The first time I became a digger wa a hot summer day. Armed with an ordinary jack-knife, blade of which was broken, I attacked the firm earth, and nearly two hours and a half, strove, like Hercules, aga one of the original elements. The work would have b nothing in the open air, even with the noonday sun bla down; but in that narrow, underground channel, where l a respiration was impossible, every movement of the musc every throb of the pulses, every beat of the heart, resemb a spasm, and the slightest exertion appeared like the great The perspiration started from all my pores, my head ach my lungs grew painful, my breath became hot and stertor The man behind me, who was engaged in removing the d insisted on my stopping, saying that I was overworking, that an hour at a time was quite as much as anybody ou to endure.

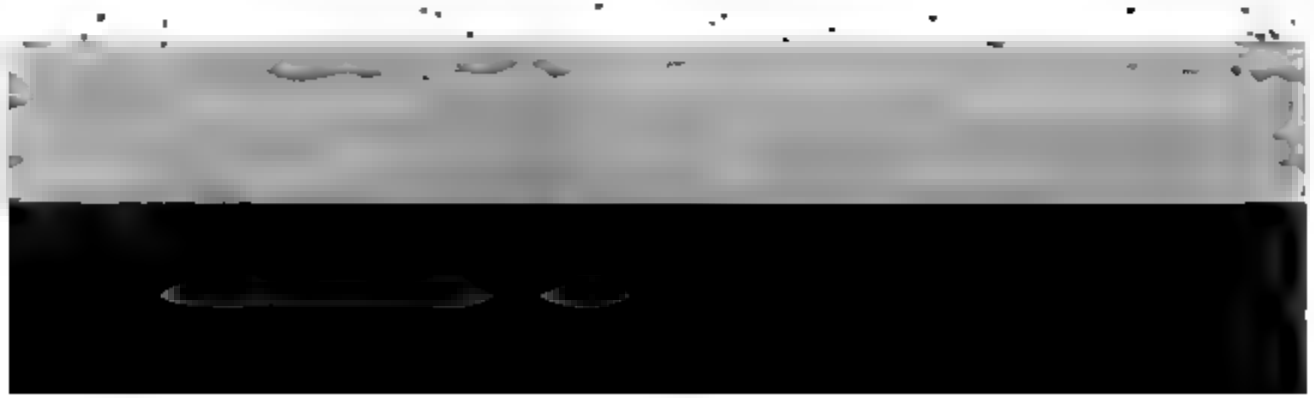
I would not heed him. My opposition was aroused, spirit of the perverse was prompting me. I had determi to stay there and toil as long as I could move my hands,

catch a breath. I went beyond my resolution. I dug and dug, and after a while the sense of semi-suffocation and the pain in my breast seemed to cease. My head appeared to be on fire; the little candle I had before me shone as a calcium light. I fancied that I was inspired, that I could never be fatigued, and I wrought feverishly, but effectually, until my assistant wondered at the amount of earth he was obliged to carry off. I imagined that hours and days had passed. While I was delving energetically, though wildly, I lost consciousness, and chaos and oblivion came. I knew nothing more until I found myself stretched on a blanket, and my faithful Achates — noble fellow that he was — bathing my face, chafing my temples, and wondering if I should ever revive.

Then I learned that I had swooned, and been dragged out of the tunnel by the feet — more dead than alive. The fever of delirium had seized me, and this I had mistaken for inexhaustible strength. Unquestionably I had been very near my end. If I had been allowed to remain there five minutes longer, I should have been thrown into the trench near the prison where so many poor fellows had gone before me, and have furnished the theme for a brief obituary.

Give me liberty or give me death! has become a stereotyped phrase. It is impossible to tell which is the better of the two; but I came much nearer gaining one than the other in the tunnel, which I had before associated only with the former.

When next I am thrown into prison — I do not believe it will be in my own country — I trust I shall have the means for constructing tunnels after an approved manner, and that they will not continue to balk my desires, and cheat my expectations. Tunnels, I must confess, have treated me shamefully. Again and again I have built high thoughts upon them; again and again I have placed implicit faith in them; again and again I have crowned their issue with the glorious symbol of freedom; and yet while they kept the word of promise to my ear, they broke it to my hope. Among perfidies they have been most perfidious, among treacheries the

most treacherous, among disappointments the mos
pointing, among deceits the most deceitful. For nea
wretched, painful, terrible years, I thought of tunnels
advocated them warmly, loved them tenderly, labo
them, in them, through them; and still in the hour
direst need, and in the mightiest peril of my being,
fused me comfort, gave me despair for bread. I neve
forget — I never can forget — that when freedom daw
last. it was through the darkened sky overhead, a
through the opened end of a channel under ground.

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